
## Florida Pharmacy Association

**129th Annual FPA Meeting and Convention**

7/10/2019 - 7/14/2019

# Transforming Health Care with Telecommunications

Christopher B. Sullivan, PhD

## Introduction to Speaker

Your speaker for this session is:

Christopher B. Sullivan, PhD

Statement of Disclosure:

"I have no vested interest or affiliation with any corporate organization offering financial support of grant money for this continuing education program, or any affiliation with an organization whose philosophy could potentially bias my presentation."

## Learning Objectives for This Session

- Describe the major technologies that enable the delivery of telehealth and telepharmacy services.
- Explain how telehealth and telepharmacy are driven by health care needs of people in remote and rural areas.
- Compare legislative, economic and business factors that favor or hinder the development of telehealth networks.
- Summarize telehealth projects that apply telecommunication-based technologies to solve specific health care problems.
- Conclude that telecommunication technologies will continue their integration with how doctors offer clinical services.

## Baseline Question 1

Are Telehealth and Telepharmacy the same?

A. Yes

B. No

C. Sometimes

D. Maybe

E. Don't Know

## Baseline Question 2

Are all Telehealth technologies new and innovative??

A. Yes

B. No

C. Sometimes

D. Maybe

E. Don't Know

## Baseline Question 3

Where are most Telehealth programs initiated today?

A. Federal Government

B. State Governments

C. Telehealth Associations

D. Private Enterprise

E. Don't Know

**Definition of Telecommunication and Telehealth**

- Telecommunications
- Telehealth versus Telemedicine
- Definitions of Telemedicine
- Medicare and Medicaid Criteria for Telehealth Services
- Legislative Definition of Telehealth
- Telepharmacy

7 Transforming Health Care with Telecommunications

**Tele-**

https://www.merriam-webster.com/dictionary/tele

Communication
Greenberg, J. & R. Baron 1995. Behavior in Organizations. Understanding and Managing the Human Side of Work. 6th Edition. London: Prentice-Hall. [GB]
https://www.jyu.fi/viesti/verkkotuotanto/ci/glossary.shtml

Communication Model
Osgood and Schramm, 1948

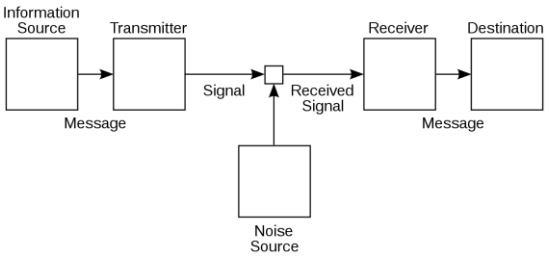
## Definition of Telecommunication

**Tele-**

- Distant - at a distance or over a distance.

**Communication**

- The process by which a person, group or organization (the sender) transmits some type of information (the message) to another person, group or organization (the receiver).




Shannon-Weaver Communication Model



**Tele-**

https://www.merriam-webster.com/dictionary/tele

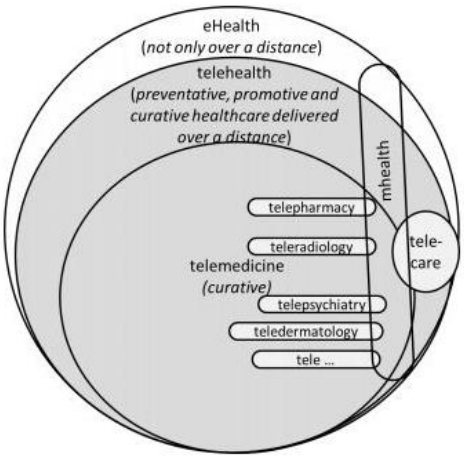
Communication
Greenberg, J. & R. Baron 1995. Behavior in Organizations. Understanding and Managing the Human Side of Work. 6th Edition. London: Prentice-Hall. [GB]
https://www.jyu.fi/viesti/verkkotuotanto/ci/glossary.shtml

Communication Model
Osgood and Schramm, 1948

## Telehealth Coverage

**The World Health Organization:**

- Telemedicine and telehealth are synonymous.




*A Review of Telehealth Service Implementation Frameworks*
Liezl van Dyk, 2014

9 Transforming Health Care with Telecommunications

**World Health Organization**
TELEMEDICINE Opportunities and developments in Member States
Report on the second global survey on eHealth
Global Observatory for eHealth series - Volume 2
2010
Some distinguish telemedicine from telehealth with the former restricted to service delivery by physicians only, and the latter signifying services provided by health professionals in general, including nurses, pharmacists, and others. However, for the purpose of this report, telemedicine and telehealth are synonymous and used interchangeably.
Four elements are germane to telemedicine:
1. Its purpose is to provide clinical support.
2. It is intended to overcome geographical barriers, connecting users who are not in the same physical location.
3. It involves the use of various types of ICT.
4. Its goal is to improve health outcomes.

http://www.who.int/goe/publications/goe_telemedicine_2010.pdf

https://www.fsmb.org/Media/Default/PDF/FSMB/Advocacy/FSMB_Telemedicine_Policy.pdf

**International Journal of Environmental Research and Public Health**
ISSN 1660-4601
www.mdpi.com/journal/ijerph
A Review of Telehealth Service Implementation Frameworks
Liezl van Dyk Industrial Engineering, Faculty of Engineering, North-West University, Potchefstroom Campus, Potchefstroom 2520, South Africa;
E-Mail: liezl.vandyk@nwu.ac.za;

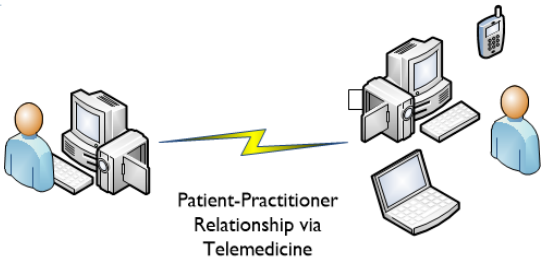


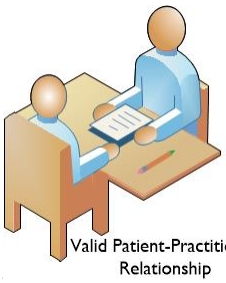
Abstract: Despite the potential of telehealth services to increase the quality and accessibility of healthcare, the success rate of such services has been disappointing. The purpose of this paper is to find and compare existing frameworks for the implementation of telehealth services that can contribute to the success rate of future endeavors. After a thorough discussion of these frameworks, this paper outlines the development methodologies in terms of theoretical background, methodology and validation. Finally, the common themes and formats are identified for consideration in future implementation. It was confirmed that a holistic implementation approach is needed, which includes technology, organizational structures, change management, economic feasibility, societal impacts, perceptions, user-friendliness, evaluation and evidence, legislation, policy and governance. Furthermore, there is some scope for scientifically rigorous framework development and validation approaches.

http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3945538/pdf/ijerph-11-01279.pdf

## Transition from Face-to-Face to Telemedicine

The social expectations of interpersonal communication shift with telehealth to include an electronic interface in a treatment setting




"Telemedicine involves… secure videoconferencing or store and forward technology to provide or support healthcare delivery by replicating a traditional, face-to-face encounter." (FSMB, 2014)



**State and National Boards**

MODEL POLICY FOR THE APPROPRIATE USE OF TELEMEDICINE TECHNOLOGIES IN THE PRACTICE OF MEDICINE

Report of the State Medical Boards' Appropriate Regulation of Telemedicine (SMART) Workgroup

Adopted as policy by the Federation of State Medical Boards in April 2014

Section Three. Definitions For the purpose of these guidelines, the following definitions apply: "Telemedicine" means the practice of medicine using electronic communications, information technology or other means between a licensee in one location, and a patient in another location with or without an intervening healthcare provider. Generally, telemedicine is not an audio-only, telephone conversation, e-mail/instant messaging conversation, or fax. It typically involves the application of secure videoconferencing or store and forward technology to provide or support healthcare delivery by replicating the interaction of a traditional, encounter in person between a provider and a patient.7

"Telemedicine Technologies" means technologies and devices enabling secure electronic communications and information exchange between a licensee in one location and a patient in another location with or without an intervening healthcare provider.

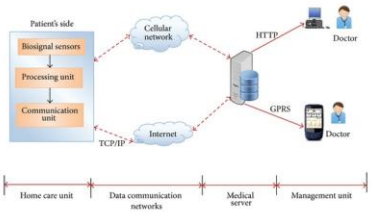
https://www.fsmb.org/Media/Default/PDF/FSMB/Advocacy/FSMB_Telemedicine_Poli

cv.pdf

## Definitions of Telemedicine

### The American Telemedicine Association

- Telemedicine supports patient care through "medical information exchanged from one site to another via electronic communications."
- Telehealth covers a "broader definition of remote healthcare that does not always involve clinical services."




### Florida Board of Medicine, 2016

- "Telemedicine" is the practice of medicine "where patient care, treatment, or services are provided through the use of medical information exchanged from one site to another via electronic communications."

11 Transforming Health Care with Telecommunications

**The American Telemedicine Association**

**What is Telemedicine?**
Telehealth and Telemedicine: Telemedicine is the use of medical information exchanged from one site to another via electronic communications to improve patients' health status. Closely associated with telemedicine is the term "telehealth," which is often used to encompass a broader definition of remote healthcare that does not always involve clinical services. Videoconferencing, transmission of still images, e-health including patient portals, remote monitoring of vital signs, continuing medical education and nursing call centers are all considered part of telemedicine and telehealth. Telemedicine is not a separate medical specialty. Products and services related to telemedicine are often part of a larger investment by health care institutions in either information technology or the delivery of clinical care. Even in the reimbursement fee structure, there is usually no distinction made between services provided on site and those provided through telemedicine and often no separate coding required for billing of remote services. Telemedicine encompasses different types of programs and services provided for the patient. Each component involves different providers and consumers.

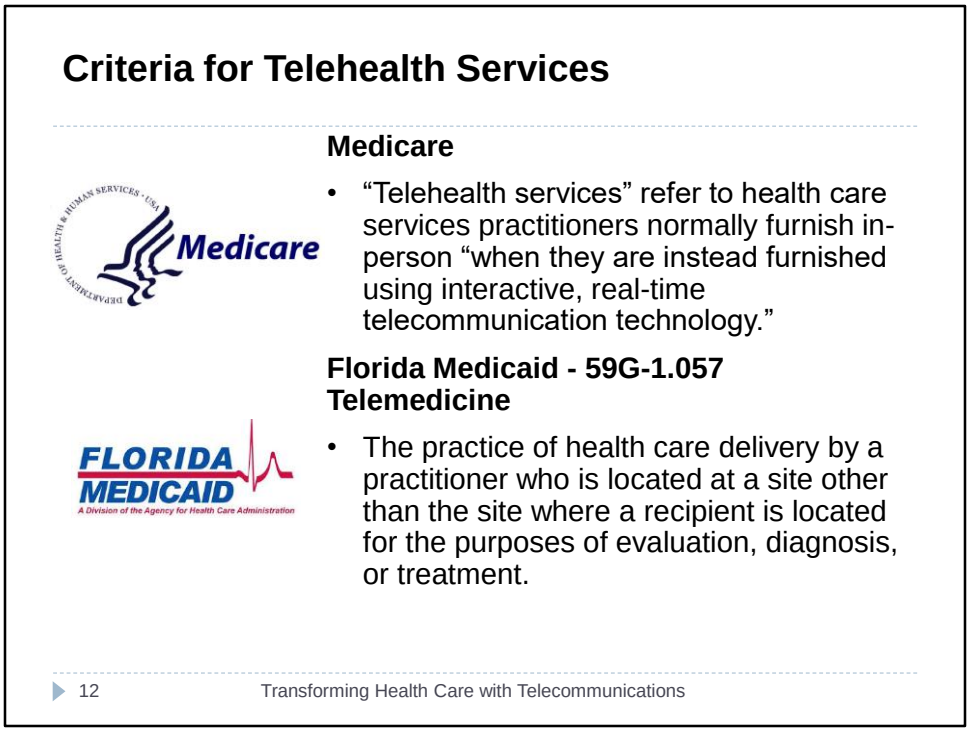
https://thesource.americantelemed.org/resources/telemedicine-glossary

**Florida Board of Medicine**

Florida Administrative Code 64B8-9.0141 Standards for Telemedicine Practice.
(1) “Telemedicine” means the practice of medicine by a licensed Florida physician or physician assistant where patient care, treatment, or services are provided through the use of medical information exchanged from one site to another via electronic communications. Telemedicine shall not include the provision of health care services only through an audio only telephone, email messages, text messages, facsimile transmission, U.S. Mail or other parcel service, or any combination thereof.
(4) Controlled substances shall not be prescribed through the use of telemedicine except for the treatment of psychiatric disorders. This provision does not preclude physicians or physician assistants from ordering controlled substances through the use of telemedicine for patients hospitalized in a facility licensed pursuant to Chapter 395, F.S.
(5) Prescribing medications based solely on an electronic medical questionnaire constitutes the failure to practice medicine with that level of care, skill, and treatment which is recognized by reasonably prudent physicians as being acceptable under similar conditions and circumstances, as well as prescribing legend drugs other than in the course of a physician’s professional practice.
(6) Physicians and physician assistants shall not provide treatment recommendations, including issuing a prescription, via electronic or other means, unless the following elements have been met:
(a) A documented patient evaluation, including history and physical examination to establish the diagnosis for which any legend drug is prescribed.
(b) Discussion between the physician or the physician assistant and the patient regarding treatment options and the risks and benefits of treatment.
(c) Maintenance of contemporaneous medical records meeting the requirements of Rule 64B8-9.003, F.A.C.
(7) The practice of medicine by telemedicine does not alter any obligation of the physician or the physician assistant regarding patient confidentiality or recordkeeping.

**Florida Board of Medicine - 64B8-9.0141**
“Telemedicine” means the practice of medicine by a licensed Florida physician or physician assistant where patient care, treatment, or services are provided through the use of medical information exchanged from one site to another via electronic communications.
Florida Board of Medicine - 64B8-9.0141 Standards for Telemedicine Practice.
https://www.flrules.org/gateway/ruleNo.asp?id=64B8-9.0141

A Wireless Emergency Telemedicine System forPatients Monitoring and Diagnosis
M. Abo-Zahhad, Sabah M. Ahmed, and O. Elnahas
International Journal of Telemedicine and Applications
https://www.hindawi.com/journals/ijta/2014/380787/




**Medicare**
Information on Medicare Telehealth
Centers for Medicare & Medicaid Services
November 15, 2018
https://www.cms.gov/About-CMS/Agency-Information/OMH/Downloads/Information-on-Medicare-Telehealth-Report.pdf

Medicare Telehealth Coverage and Payment Policies
Medicare fee-for-service (FFS) coverage for telehealth is currently defined under Section 1834 of the Social Security Act (the Act).
i1 Current law limits separate Medicare payment for telehealth services to those that are furnished via a telecommunications system by a physician or certain other types of practitioners to an eligible individual who is not at the same location. The statute generally requires that Medicare pay for certain services, including office visits, consultations, and office psychiatry services, that are furnished using an interactive audio and video telecommunications system that permits real-time communication between a Medicare beneficiary and a physician or certain other practitioner, with payment for telehealth services furnished through the use of asynchronous store-and-forward technologies permitted only for Federal telemedicine demonstration programs in Alaska or Hawaii. Separate Medicare FFS payment for telehealth services furnished at an authorized originating site is limited to those on the list of Medicare telehealth services, which includes the services specified in the statute and other

services that are added through the annual Physician Fee Schedule notice and comment rulemaking.

Current law permits Medicare to pay for telehealth services only if the beneficiary is furnished those services while present in an originating site that is located in certain types of geographic areas (either a rural health professional shortage area or a county outside of a Metropolitan Statistical Area), or that is participating in a Federal telemedicine demonstration project approved by (or receiving funding from) the Secretary of Health and Human Services as of December 31, 2000. Current law only allows eight types of healthcare settings to serve as originating sites.

TELEHEALTH SERVICES
ICN 901705 January 2019

Originating Sites
A county outside a Metropolitan Statistical Area (MSA)
A rural Health Professional Shortage Area (HPSA) in a rural census tract

TELEHEALTH SERVICES
You must use an interactive audio and video telecommunications system that permits real-time
communication between you at the distant site, and the beneficiary at the originating site.
Transmitting medical information to a physician or practitioner who reviews it later is permitted only in
Alaska or Hawaii Federal telemedicine demonstration programs.

https://www.cms.gov/Outreach-and-Education/Medicare-Learning-Network-MLN/MLNProducts/downloads/TelehealthSrvcsfctsht.pdf?utm_campaign=2a178f351b-EMAIL_CAMPAIGN_2019_04_19_08_59&utm_term=0_ae00b0e89a-2a178f351b-353229765&utm_content=90024810&utm_medium=social&utm_source=facebook&hss_channel=fbp-372451882894317

**Florida Medicaid**

**59G-1.057 Telemedicine.**
(1) This rule applies to any person or entity prescribing or reviewing a request for Florida Medicaid services and to all providers of Florida Medicaid services that are enrolled in or registered with the Florida Medicaid program.
(2) Definition. Telemedicine – The practice of health care delivery by a practitioner who is located at a site other than the site where a recipient is located for the purposes of evaluation, diagnosis, or treatment.

(3) Who Can Provide. Practitioners licensed within their scope of practice to perform the service.
(4) Coverage. Florida Medicaid reimburses for telemedicine services using interactive telecommunications equipment that includes, at a minimum audio and video equipment permitting two-way, real time, interactive communication between a recipient and a practitioner.
(5) Exclusion. Florida Medicaid does not reimburse for:
(a) Telephone conversations, chart review(s), electronic mail messages, or facsimile transmissions.
(b) Equipment required to provide telemedicine services.
(6) Reimbursement. The following applies to practitioners rendering services in the fee-for-service delivery system:
(a) Florida Medicaid reimburses the practitioner who is providing the evaluation, diagnosis, or treatment recommendation located at a site other than where the recipient is located.
(b) Providers must include modifier GT on the CMS-1500 claim form, incorporated by reference in Rule 59G-4.001, F.A.C.
*Rulemaking Authority 409.919 FS. Law Implemented 409.905 FS. History–New 6-20-16.*

## Legislative Definition of Telehealth

**Florida Legislature, 2019 Telehealth Bill**

- "Telehealth" means the use of synchronous or asynchronous telecommunications technology by a telehealth provider to provide health care services, including:
  - Assessment, diagnosis, consultation, treatment, and monitoring of a patient;
  - Transfer of medical data;
  - Patient and professional health-related education;
  - Public health services;
  - Health administration.
- The term does not include audio-only telephone calls, e-mail messages, or facsimile transmissions.



Florida House of Representatives
2019 Legislature
ENROLLED CS/CS/HB 23, Engrossed 1
http://www.flsenate.gov/Session/Bill/2019/23/BillText/er/PDF

(a) "Telehealth" means the use of synchronous or asynchronous telecommunications technology by a telehealth provider to provide health care services, including, but not limited to, assessment, diagnosis, consultation, treatment, and monitoring of a patient; transfer of medical data; patient and professional health-related education; public health services;and health administration. The term does not include audio-only telephone calls, e-mail messages, or facsimile transmissions.

## Definition of Telepharmacy

**Florida Administrative Code**

Florida's Practice of Pharmacy does not address Telepharmacy

**National Association of Boards of Pharmacy**

"Practice of Telepharmacy" means the provision of Pharmacist Care Services by registered Pharmacies and Pharmacists located within US jurisdictions through the use of telecommunications or other technologies to patients or their agents at distances that are located within US jurisdictions.

- The Practice of Telepharmacy does not restrict the pharmacist to interactive, two-way telecommunications.



**Model State Pharmacy Act and Model Rules of the National Association of Boards of Pharmacy**

**August 2016**
**Section 105. Definitions.**

"Practice of Telepharmacy" means the provision of Pharmacist Care Services by registered Pharmacies and Pharmacists located within US jurisdictions through the use of telecommunications or other technologies to patients or their agents at distances that are located within US jurisdictions.

"Practice of Telepharmacy Across State Lines" means the Practice of Telepharmacy when the patient is located within a US jurisdiction and the pharmacist is located in a different US jurisdiction.

"Practitioner" means an individual currently licensed, registered, or otherwise authorized by the appropriate jurisdiction to prescribe and Administer Drugs in the course of professional practice.

"Valid Patient-Practitioner Relationship" means the following have been established:

a Patient has a medical complaint;
a medical history has been taken;
a face-to-face physical examination adequate to establish the medical complaint has been performed by the prescribing practitioner or in the instances of telemedicine through telemedicine practice approved by the

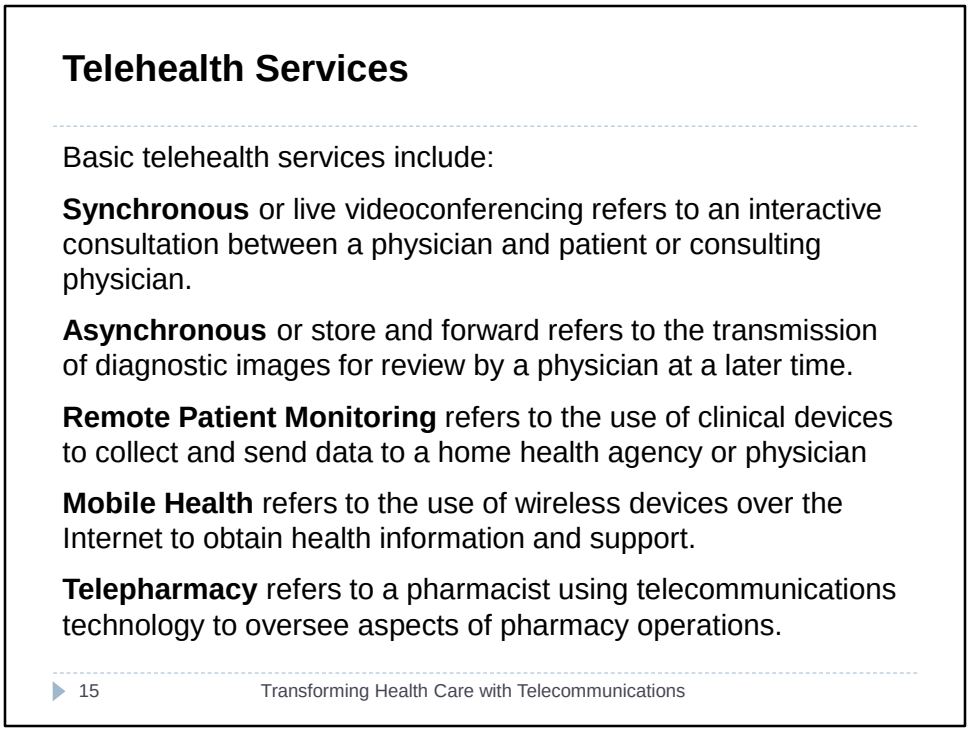
appropriate Practitioner Board; and
some logical connection exists between the medical complaint, the medical history, and the physical examination and the Drug prescribed.

Section 105(q6). Comment.
A Valid Patient-Practitioner Relationship includes a relationship with a consulting Practitioner or a Practitioner to which a patient has been referred, or a covering Practitioner, or an appropriate Practitioner-Board-approved telemedicine Practitioner providing that a physical examination had been previously performed by the patient's primary Practitioner.
(c) the prescribing Practitioner is issuing a prescription through a telemedicine practice approved by the appropriate state agency that provides health care delivery, diagnosis, consultation, or treatment by means of audio, video, or data communications. Standard telephone, facsimile transmission, or both, in the absence of other integrated information or data, do not constitute telemedicine practices.
Section 301. Unlawful Practice.
(b) The provision of Pharmacist Care Services to an individual in this State, through the use of telecommunications, the Internet, or other technologies, regardless of the location of the pharmacist, shall constitute the Practice of Pharmacy and shall be subject to regulation.
(1) Licensed Pharmacies located outside this State that provide Pharmacist Care Services to individuals in this State must be licensed within this State under Article V of this Act.
(2) Pharmacists located outside this State who are providing Pharmacist Care Services outside of a licensed Pharmacy to individuals located in this State must register with this State to engage in the nonresident Practice of Pharmacy.
The "Practice of Telepharmacy" is deemed to occur within the jurisdiction in which the patient is located and the jurisdiction(s) in which the pharmacist and, if applicable, pharmacy are located; therefore, such practice will be subject to the Pharmacy practice regulations of all jurisdictions' Boards of Pharmacy.

The definition of "Practitioner" anticipates that those persons other than Pharmacists who are permitted to prescribe and Administer Drugs will be specifically so authorized in other legislation.

NABP recognizes that protection of the public health should extend across State borders. Accordingly, the NABP *Model Act* incorporates the Practice of Telepharmacy Across State Lines within the scope of the "Practice of Pharmacy" and requires an independently practicing pharmacist located outside this State to obtain full licensure for providing Pharmacist Care Services from outside the State to patients within the State.

http://www.fsmb.org/Media/Default/PDF/Publications/FSMB%20Telemedicine%20Policy%20News%20Release_042614.pdf



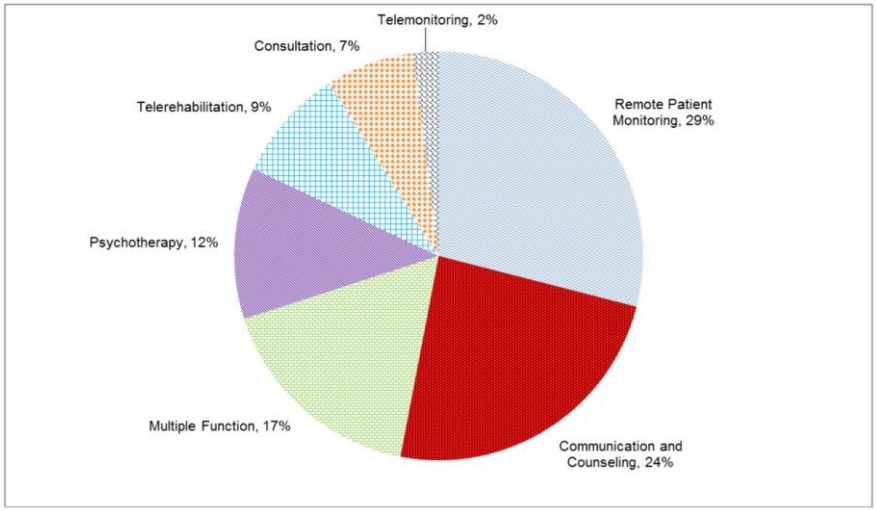

https://www.americantelemed.org/resource/
https://www.americantelemed.org/resource/why-telemedicine/Services Provided by Telehealth

**How common is telehealth?**

Telehealth is health. It is a significant and rapidly growing modality of care in the United States and utilization rates are rising. According to a 2018 JAMA study, annual telemedicine visits have increased at an average annual compound growth rate of 52% from 2005 to 2014. The AHA states that 76% of U.S. hospitals connect with patients and consulting practitioners using video and other technology, and a study performed by NGBH revealed that virtually all (96%) of the nation's large employers will provide medical coverage for telehealth in 2019.
https//www.americantelemed.org/resource/why-telemedicine/

## Telehealth Applications

**Figure 7. Distribution of telehealth function across included systematic reviews**



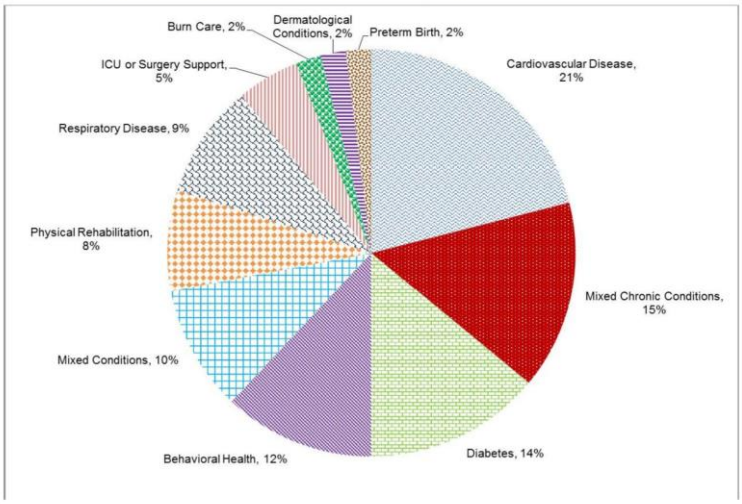

16 Transforming Health Care with Telecommunications

**Telehealth: Mapping the Evidence for Patient Outcomes From Systematic Reviews**
Technical Brief Number 26
AHRQ Publication No. 16-EHC034-EF June 2016
https://effectivehealthcare.ahrq.gov/sites/default/files/pdf/telehealth_technical-brief.pdf

Figure 6. Distribution of clinical focus across included systematic reviews
Figure 6 depicts the distribution across clinical focus areas for the included reviews. Taking into account the number of reviews, primary studies, and patients, the most common clinical focus areas studied were cardiovascular disease (12 reviews). The next largest group was mixed chronic conditions (9 reviews), followed by diabetes (8), behavioral health (7), and mixed conditions (6).Focus areas with five or fewer included systematic reviews were physical rehabilitation (5), respiratory disease (5), ICU or surgery support (3), burn care (1), dermatology conditions (1),and preterm birth (1). Over one-quarter of included systematic reviews (26%) focused on mixed chronic or mixed but not exclusively chronic conditions.

## Clinical Focus of Telehealth Services

**Figure 6. Distribution of clinical focus across included systematic reviews**




ICU = intensive care unit

17 Transforming Health Care with Telecommunications

**Telehealth: Mapping the Evidence for Patient Outcomes From Systematic Reviews**
Technical Brief Number 26
AHRQ Publication No. 16-EHC034-EF June 2016
https://effectivehealthcare.ahrq.gov/sites/default/files/pdf/telehealth_technical-brief.pdf

**Figure 7. Distribution of telehealth function across included systematic reviews**
Figure 7 depicts the distribution of the function the telehealth interventions perform in health care delivery. The included reviews examined telehealth used to provide treatment, monitor patients' signs and symptoms, or facilitate communication between provider and patient. These functions could replace or supplement in person service delivery. Telehealth was most frequently used for remote patient monitoring (17 reviews) and communication and counseling (14 reviews).Ten reviews combined research on multiple functions, seven summarized studies in which telehealth was used for deliver psychotherapy and five reviews focused on telerehabilition. Four reviews examined studies in which telehealth was used to provide consultations about patient care and one review focused on telementoring.

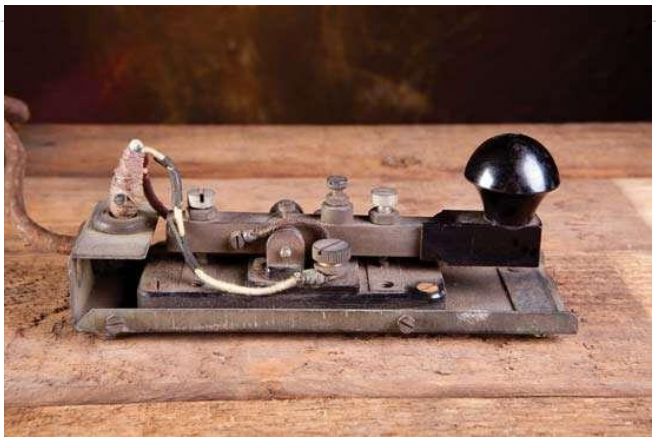
## Telehealth is Result of Technological Invention

### A Background History of Telehealth Technology

The increasing sophistication of communication technology and increase in transmission speed provides greater opportunities for the application of health care services.

- Telegraph – Samuel Morse, 1844
- Telephone – Alexander Graham Bell, 1877
- Wireless Telegraph (radio) – Guglielmo Marconi, 1894
- Television – Philo T. Farnworth, 1927
- Cable Telecommunications – Television Industry, 1940s
- The Internet – US Dept of Defense, ARPANET, 1960s
- Wireless Cell Phone, Telecommunications Industry, 1980s

## Samuel Morse - the Telegraph



In 1844 Samuel Morse sent his first telegraph message, from Washington, D.C., to Baltimore, Maryland. By 1866, a telegraph line had been laid across the Atlantic Ocean from the U.S. to Europe.

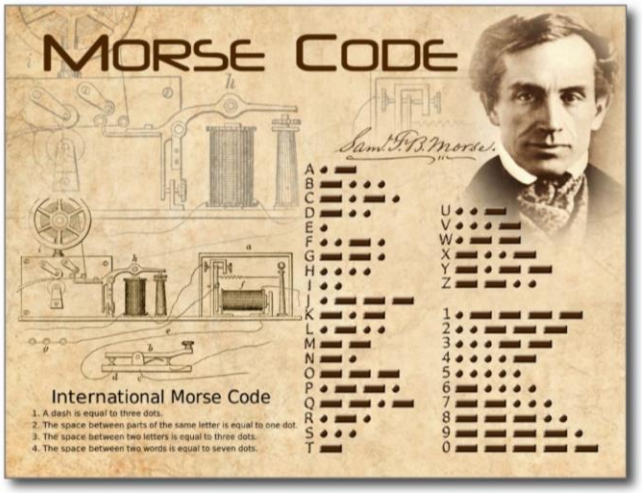


**146618-004-B71C2A44.jpg**
https://www.britannica.com/topic/Morse-Code

**Morse Code & the Telegraph**
https://www.history.com/topics/inventions/telegraph
In 1844, Morse sent his first telegraph message, from Washington, D.C., to Baltimore, Maryland; by 1866, a telegraph line had been laid across the Atlantic Ocean from the U.S. to Europe.

**What the Digital Age Owes to the Inventor of Morse Code**
Even if Morse's reputation were limited to his famous invention, however, he would still deserve more attention than he receives. Antiquated though it seems, the telegraph represented a revolution in communications rivaling both the printing press and Internet. Indeed, thanks to Morse's invention, communication was, for the first time in history, no longer limited to the speed at which a physical message could pass between locations. So long as they were linked by telegraphic wires, humans were liberated from the tyranny of distance; Samuel F. B. Morse had, in the saying of contemporaries, "obliterated time and space."
https://qrznow.com/what-the-digital-age-owes-to-the-inventor-of-morse-code/

## Morse Code as a Communication Invention



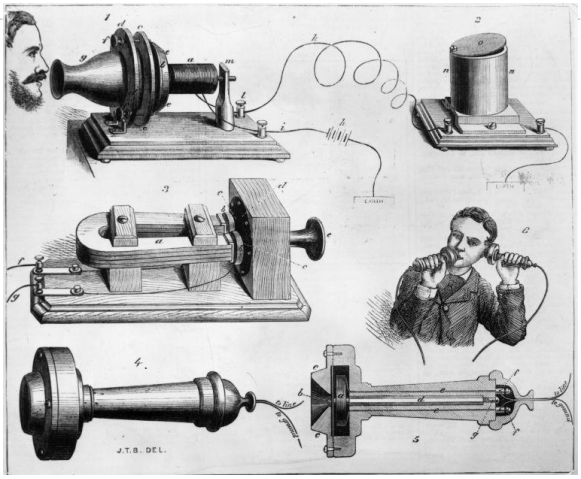

Samuel Morse invented a specialized code of "dots and dashes," foreshadowing the use of binary code in computing today.



**codigo_morse_cartao_postal-rff465464129d423792d1dab632342372_vgbaq_8byvr_1024.jpg**
https://qrznow.com/what-the-digital-age-owes-to-the-inventor-of-morse-code/

Even if Morse's reputation were limited to his famous invention, however, he would still deserve more attention than he receives. Antiquated though it seems, the telegraph represented a revolution in communications rivaling both the printing press and Internet. Indeed, thanks to Morse's invention, communication was, for the first time in history, no longer limited to the speed at which a physical message could pass between locations. So long as they were linked by telegraphic wires, humans were liberated from the tyranny of distance; Samuel F. B. Morse had, in the saying of contemporaries, "obliterated time and space."

## Alexander Graham Bell – The Telephone



Alexander Graham Bell was working on a design for a multi-line telegraph when he developed the telephone in 1876.



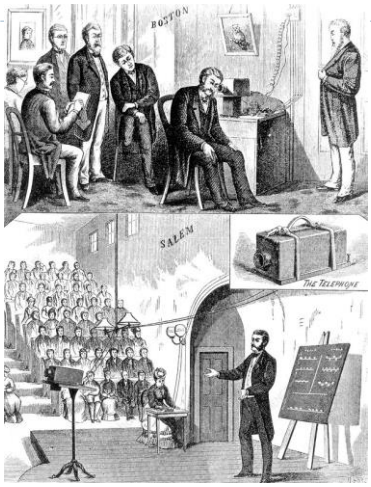
**lexB3.jpg**
http://thisdaythen.blogspot.com/2012/03/10th-march-1876-alexander-graham-bell.html
10th March 1876 - Alexander Graham Bell makes the first ever phone call - "Mr Watson? Come here. I want to see you." And with those words on this day in 1876, Alexander Graham Bell gave the world the telephone...

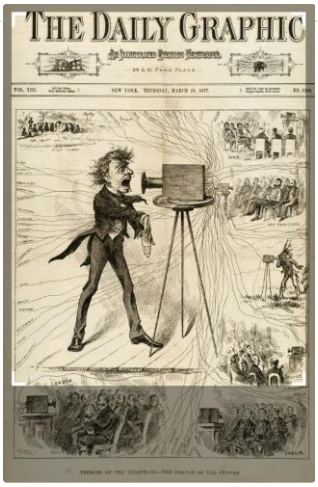
The telegraph was already firmly established, transmitting messages through morse code, and becoming a popular means of communication but it was limited because each "line" needed its own wire, leading to a race to design a system which would be capable of transmitting multiple messages at the same time, a race which Thomas Edison and Elisha Gray were also running. Bell secured financing from two wealthy patrons though and decided to take the initiative one step further: transmission of the human voice. He hired Thomas A Watson, an experienced electrical designer and mechanic as his assistant and the two set to work...

Bell and Gray both filed their patents on the same day - Valentines Day 1876 - and Bell was then issued his on 7th March. 3 days later, on this day in 1876, Bell achieved the breakthrough using a liquid transmitter (the exact same device Gray had been working on), speaking those famous words "Mr Watson, come here, I need to see you", which were heard clearly by Watson in the next room...

He and his lawyers offered to sell the patent to Western Union for $100,000 but their President laughed them off, claiming they had invented a toy, nothing more. Within 2 years, this toy was worth more than $25 million and Bell no longer had any desire to sell...

## The Telephone Offered Distant Communication




Bell anticipated that the telephone would be used for listening to speeches and operas by audiences who had no access to them.

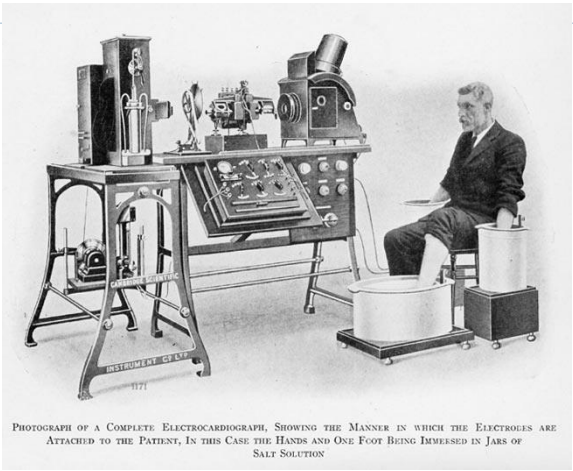


**C0333926-Bell_and_Watson_Demonstrate_Telephone,_1877.jpg**
https://www.sciencephoto.com/media/813431/view/bell-and-watson-demonstrate-telephone-1877

Bell and Watson Demonstrate Telephone, 1877
The public had to be taught the principle and function of the telephone. Gardner Hubbard, Bell's father-in-law, arranged a series of lectures to be given by Bell and Watson. The first demonstration was given before the Essex Institute of Salem, in 1877. Watson, in Boston, played musical instruments and sang. The audience was delighted. By courtesy of Mann & Company. From the Scientific American of March 31, 1877.

**Daily Graphic Telephone.JPG**
https://www.pinterest.com/pin/402861129149373858/visual-search/?x=16&y=15&w=530&h=671
Terrors of the Telephone (Daily Graphic, New York, March 15, 1877)

## Willem Einthoven's Telecardiogram



PHOTOGRAPH OF A COMPLETE ELECTROCARDIOGRAPH, SHOWING THE MANNER IN WHICH THE ELECTRODES ARE ATTACHED TO THE PATIENT, IN THIS CASE THE HANDS AND ONE FOOT BEING IMMERSED IN JARS OF SALT SOLUTION

In 1905, Willem Einthoven used a telephone cable to transmit the first "telecardiogram" from a hospital to his laboratory.



inthoven_ECG.jpg
https://en.ecgpedia.org/index.php?title=File:Einthoven_ECG.jpg

Willem Einthoven (1860–1927):
Father of electrocardiography
Cardiology Journal
2007, Vol. 14, No. 3, pp. 316–317

ISSN 1897–5593

On March 22nd 1905 Einthoven recorded the first tele-cardiogram. He utilized a telephone cable to transmit the signal from the hospital to his laboratory 1.5 km. During the next seven years Einthoven developed his equilateral triangle of limb leads considering the extremities as mere extensions of the electrodes. The size and direction of the electrical potentials of the heart were calculated from a simultaneous registration of the three contacts.

"Clinical" electrocardiograms were then transmitted by a cable from patients with heart disease in the hospital to Einthoven's laboratory. This clinical application was suggested by Einthoven's good friend Lewis. The correspondence between them is

available thanks to H.A. Snellen's continued interest in publishing Einthoven's writings [1].

## Guglielmo Marconi Invents the "Wireless"

In 1894, Guglielmo Marconi developed the first successful long-distance wireless telegraph.

- The first transatlantic radio signal was broadcast in 1901.

24 Transforming Health Care with Telecommunications

**GMarconi1.JPG**
https://www.thoughtco.com/guglielmo-marconi-biography-4175003

**Guglielmo Marconi: Father of the Radio**
https://www.thoughtco.com/guglielmo-marconi-biography-4175003
By **Robert Longley**
Updated October 15, 2018
Guglielmo Marconi (April 25, 1874 to July 20, 1937) was an Italian inventor and electrical engineer known for his pioneering work on long-distance radio transmission, including the development of the first successful long-distance wireless telegraph in 1894 and the broadcast of the first transatlantic radio signal in 1901. Among many other awards, Marconi shared the 1909 Nobel Prize in Physics for his contributions to radio communications. Radios made by the Marconi Co. greatly facilitated ocean travel and helped to save hundreds of lives, including survivors of the sinking of the RMS Titanic in 1912 and the RMS Lusitania in 1915.

## The Wireless Changed Maritime Communications

New-York Tribune.

NEW-YORK, TUESDAY, APRIL 16, 1912—FOURTEEN PAGES. PRICE ONE CENT

1,340 PERISH AS TITANIC SINKS; ONLY 886, MOSTLY WOMEN AND CHILDREN, RESCUED

CROWD BESIEGES WHITE STAR OFFICE

Line Officials Only Able to Tell Inquirers That but 675 of 2,200 Were Saved.

VINCENT ASTOR SEEKS NEWS

On Early Bulletins Two of Strauss Family Started for Halifax to Meet Mr. and Mrs. Isidor Straus.

DIAGRAMMATIC MAP SHOWING POSITION OF THE TITANIC WHEN SHE STRUCK THE ICEBERG AND LINERS RUSHING TO HER ASSISTANCE.

HALIFAX

ATLANTIC OCEAN

SANK 2:20 A.M.

NEW YORK

Wireless from Olympic's Captain Gives News and Weeping Women Gather at White Star Offices to Learn Fate of Relatives —1,323 Passengers on Ship and Crew of 890.

SURVIVORS EIGHT HOURS IN BOATS

No Word from Virginian or Parisian, Which Vice-President Franklin Hopes Saved Others—Disaster Greatest in History, if Hope Is Unfounded—Captain Believed to Have Gone Down at His Post of Duty.

| | |
|---|---|
| FIRST CLASS PASSENGERS ON TITANIC | 318 |
| SECOND CLASS PASSENGERS ON TITANIC | 261 |
| THIRD CLASS PASSENGERS ON TITANIC | 748 |
| CREW OF THE TITANIC | 890 |
| TOTAL | 2,200 |
| REPORTED SAVED ON THE CARPATHIA | 866 |
| MISSING | 1,343 |

The White Star liner Titanic sank at 2:20 a. m. yesterday about 1,330 miles east of Sandy Hook.

First reports placed the number of survivors, passengers and crew,

Following the Titanic disaster, the Wireless Act of 1912 required all ships to maintain wireless communications at all time.



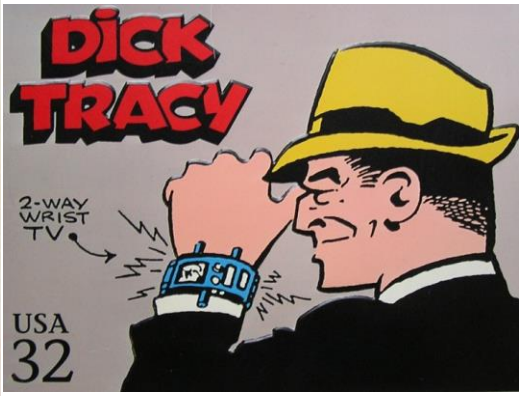
**tumblr_m2jbceo9Ll1qbva5ao1_1280.jpg**
https://activly.com/20-chilling-facts-about-the-titanic-you-wouldnt-fathom/38/

**The Wireless Act of 1912 - Sinking of the Titanic**
https://www.cybertelecom.org/notes/history_wireless_earlyreg12t.htm
Derived From: Radio Pioneers & Core Technologies, FCC History: The "unsinkable" Titanic was equipped with a state-of-the-art Marconi radio system: a rotary spark transmitter, powered by a 5 kilowatt alternator that fed off the ship's lighting circuit, a four wire antenna hoisted 250 feet in the air between the ship's masts, and even a battery powered emergency transmitter. There was a guaranteed transmission range of 250 miles, but at night transmissions could go up to 2000 miles. The two radio operators expected to spend all their time sending and receiving personal communications from the wealthy passengers. And, in fact, from the April 12 sailing until the ship hit the iceberg just past midnight on April 15 they sent 250 such messages…

"Following the Titanic disaster the Wireless Act of 1912 amending the Radio Ship Act of 1910 was quickly passed and became Public Law 238 of 23 July 1912. This amendment to Public Law 262 of 24 June 1910 included shipping on the Great Lakes; required auxiliary power supply, independent of the vessel's main electric powerplant, capable of enabling radio apparatus to be operated continuously for at least 4 hours at a minimum range of 100 miles, day or night; and, made it compulsory

for ships to carry two or more persons skilled in the use of such apparatus.

## Predictions for the Video Telephone

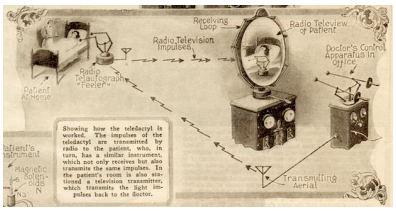

1918 – The Telephot was predicted as a futuristic device that could be connected to the telephone system. Dick Tracy followed suit.



**The Electrical Eperimenter**
Volume Vol. 6 (May 1918- Apr. 1919
https://archive.org/details/electricalex619181919gern/page/n5

**65a87e58e9bf0a20225f1979775b485b.jpg (Dick Tracy)**
https://arago.si.edu/record_193843_img_1.html

## Early Telemedicine Predictions


*Telemedicine in 1925:* Using the "Teledactyl," a busy doctor could make a virtual house call using remote control arms and video screen.

27 Transforming Health Care with Telecommunications

Telemedicine Predicted in 1925
**With video screens and remote control arms, any doctor could make a virtual housecall**
By Matt Novak
smithsonian.com
March 14, 2012

"The Teledactyl (Tele, far; Dactyl, finger — from the Greek) is a future instrument by which it will be possible for us to "feel at a distance." This idea is not at all impossible, for the instrument can be built today with means available right now. It is simply the well known telautograph, translated into radio terms, with additional refinements. The doctor of the future, by means of this instrument, will be able to feel his patient, as it were, at a distance….The doctor manipulates his controls, which are then manipulated at the patient's room in exactly the same manner. The doctor sees what is going on in the patient's room by means of a television screen."

"The busy doctor, fifty years hence, will not be able to visit his patients as he does now. It takes too much time, and he can only, at best, see a limited number today. Whereas the services of a really big doctor are so important that he should never have to leave his office; on the other hand, his patients cannot always come to him. This is where the teledactyl and diagnosis by radio comes in."

Read more: http://www.smithsonianmag.com/history/telemedicine-predicted-in-1925-124140942/#c5xoik02g2bChBXD.99
Follow us: @SmithsonianMag on Twitter

## 20120314092039 1925-feb-science-and-invention-470x251.jpg

Retrieved from: http://www.smithsonianmag.com/history/telemedicine-predicted-in-1925-124140942

## Electronic Scanning as Basis of Television

SECOND SECTION
PAGES 11 TO 22

San Francisco Chronicle

FOUNDED 1865 CCC SAN FRANCISCO, CAL., MONDAY, SEPTEMBER 3, 1928

**S. F. Man's Invention to Revolutionize Television**

**NEW PLAN BANS ROTATING DISC IN BLACK LIGHT**

**W. W. Crocker, R. N. Bishop Head Local Capitalists Backing Genius**

Two major advances in television were announced yesterday by a young inventor who has been quietly working away in his laboratory in San Francisco and has evolved a system of television basically different from any system yet placed in operation.

The inventor is Philo T. Farnsworth, and local capitalists, headed by W. W. Crocker and Roy N. Bishop, are financing the experiments and have aided him in obtaining basic patents on his system.

In any method of transmitting moving images at a distance, some means must be evolved of breaking the image into pin points of light. These points are translated into electrical impulses, the electrical impulses are collected at the receiving end and translated back into light, and the image results.

These points are translated into electrical impulses, the electrical impulses are collected at the receiving end and translated back into light, and the image results.

**NEW PRINCIPLE APPLIED**

All television systems now in use employ a revolving disc, two feet in diameter, to break up or "scan" the image. A similar disc is at the receiving end, and the two discs must revolve at precisely the same instant and at precisely the same speed or blurred vision results.

Farnsworth's system employs no moving parts whatever. Instead of moving the machine, he varies the electric current that plays over the image and thus gets the necessary scanning.

The system is thus simple in the extreme, and one of the major mechanical obstacles to the perfection of television is thereby removed.

It was through this simplicity that he achieved his second great advance, the cutting in half of the wave band length necessary to prevent television broadcasts interfering with each other. The importance of this is manifest, inasmuch as it requires approximately four times the wave band length for television that ordinary sound broadcasting requires. Farnsworth has cut this television wave band in half and is hoping for still further reduction.

**PERFECT MOTION RECORDS**

His system sends twenty pictures per second, so motion is perfectly recorded, and there are 6000 elements, or pin points of light, in each picture to insure detail. The laboratory model he has built transmits the image on a screen one and one-quarter inches square. It is a queer looking little image in bluish light now, one that frequently smudges and blurs, but the basic principle is correct and perfection is now a matter of engineering.

The sending tube which is the heart of Farnsworth's transmitting set is about the size of an ordinary quart jar that a housewife uses for preserving fruit, and the receiving tube containing the screen is even smaller. Farnsworth estimates the receiving apparatus could easily be attached to an ordinary radio set and can be manufactured to retail at $100 or less.

Farnsworth is a native of Provo, Utah, and conceived the idea for his television set while a student at Brigham Young University there. He was discovered by George Everson and Leslie Gorrell, who brought the set to the attention of research engineers at the California Institute of Technology. These experts pronounced it workable and helped Farnsworth obtain financial backing. The research laboratories are at 202 Green street.

**Young Genius and Part of His New Black Light Machine**

Philo T. Farnsworth holding the sending and receiving tubes of his new television set.

In 1927, Philo Farnsworth successfully transmitted the first electronic television image, creating the TV standard.



**Philo T. Farnsworth – The Forgotten Genius**
MZTV Farnsworth Exhibit — The History Of Television
https://www.thehistoryoftv.com/mztv-ptf-tour 1/

MZTV-PTF-Exhibit-Banner-v04.jpg
13_Newspaper_Chronicle_Article_ADJ_2_resize.jpg
https://www.thehistoryoftv.com/mztv-ptf-tour

The Farmboy Who Invented Television
https://www.smithsonianmag.com/smart-news/farmboy-who-invented-television-while-plowing-180964607/

Farnsworth, had aspired to be an inventor since the age of six, writes Evan I. Schwartz for the MIT Technology Review. By the end of his life, he would hold more than 300 patents related to television and other matters. On August 26, 1930, he received a patent for the first totally electronic television system, about a decade after first having the idea that underlaid his invention.

Farnsworth wasn't the first person to dream up television–but, importantly, he was the first person to find a way to make it work without a mechanical aspect. The biggest problem that inventors faced was how to transmit image data. Farnsworth's central innovation was to imagine a way of doing it that relied on electronic

technology alone, and so wasn't slowed down by the abilities of a mechanical image-transmitting system like the ones used by earlier television developers. Schwartz, who went on to write a book about Farnsworth, explains how it happened:

According to surviving relatives, Farnsworth dreamed up his own idea for electronic- rather than mechanical-television while driving a horse-drawn harrow at the family's new farm in Idaho. As he plowed a potato field in straight, parallel lines, he saw television in the furrows. He envisioned a system that would break an image into horizontal lines and reassemble those lines into a picture at the other end. Only electrons could capture, transmit and reproduce a clear moving figure. This eureka experience happened at the age of 14.

There were many things between this vision and Farnsworth's television patent. He and his wife, Elma Gardner Farnsworth, moved from Utah to California to be closer to the motion-picture community and keep working on their innovation. In 1927, Philo and Elma watched as he made the first transmission: a horizontal line, transmitted to a receiver in the next room, wrote The New York Times in Elma Farnsworth's 2006 obituary. Two years later, Farnsworth transmitted an image of Elma and her brother, making her the first woman on TV.

Televisionary _ WIRED.pdf
https://www.wired.com/2002/04/farnsworth/

## The First Farnsworth Television


The first television integrated the electronic scanning tubes invented by Farnsworth and the wireless capability of radio.



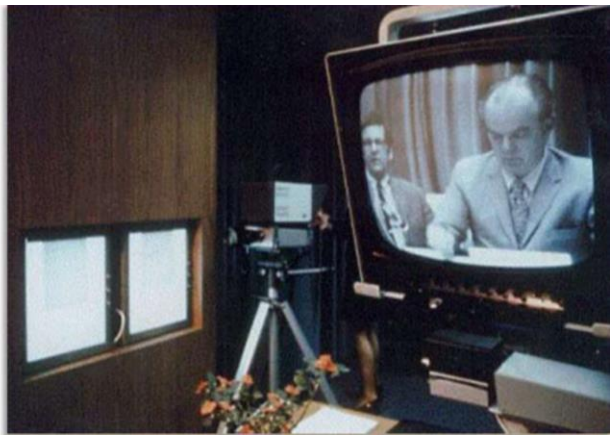
**Philo T. Farnsworth – The Forgotten Genius**
MZTV Farnsworth Exhibit — The History Of Television
https://www.thehistoryoftv.com/mztv-ptf-tour 1/

Philo Taylor Farnsworth was a 14-year-old farm boy when he came up with the concept of electronic television in 1921. During his lifetime he amassed over 160 patents for his inventions. In addition to TV, he worked on the development of radar, the electron microscope, night vision, the human infant incubator, the gastroscope, and his final frontier, a combination of nuclear energy and electronics he called “nucleonics."

A summer job near Rigby, Idaho provided the fertile soil for his “big idea.”... (Observing the harrow disk from the plow) 14-year-old Philo Farnsworth used in 1921 to create the lines in the dirt that inspired his concept for electronic television. His “big idea” was that if he could train electrons to scan a picture from side-to-side, the way his horses moved across the field, he could send images to distant locations where they could be reconstructed line-by-line. He had not yet been to high school.

## The First Telehealth System in Boston

**Kenneth T. Bird:**
"Telemedicine can be defined as the practice of medicine by means of an interactive audio-video communications system without the usual physician-patient physical confrontation. Telemedicine depends on the physician and his special abilities. It does not replace him or alter his role. In fact telemedicine multiplies the usefulness of the specialist and enlarges his horizons while simultaneously maintaining his position at the focal point of all health care activities"



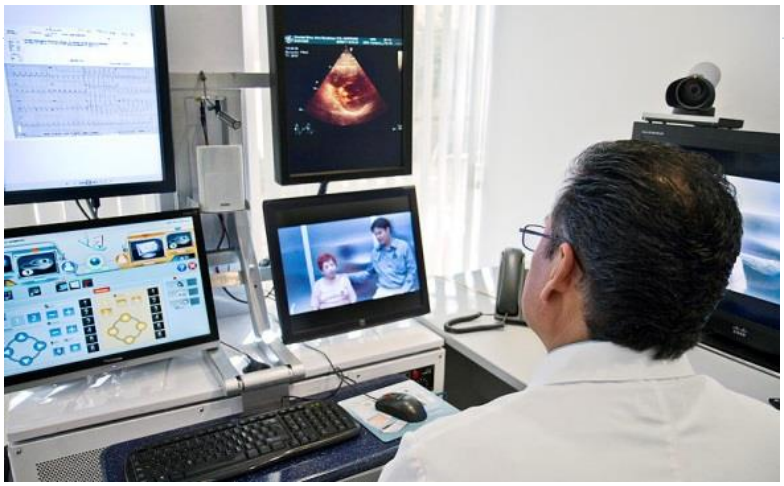
In 1967, Dr. Kenneth Bird, MD, installed a TV link between Mass General Hospital and Logan Airport in Boston to provide health care treatment to passengers in the airport and to avoid traffic.



**The Nuts and Bolts of Building a Telehealth Program**
Jonathan Neufeld, PhD
Georgia Partnership for Telehealth Conference
Savannah, Georgia
March 26, 2015
https://www.slideshare.net/gatelehealth/jonathan-neufeld-nuts-and-bolts

**How 'A Stupid Idea' Gave Birth to Telemedicine**
by Jay H. Sanders MD
December 30, 2015
https://www.medpagetoday.com/practicemanagement/informationtechnology/55457

## Physician Office – Telehealth Technology

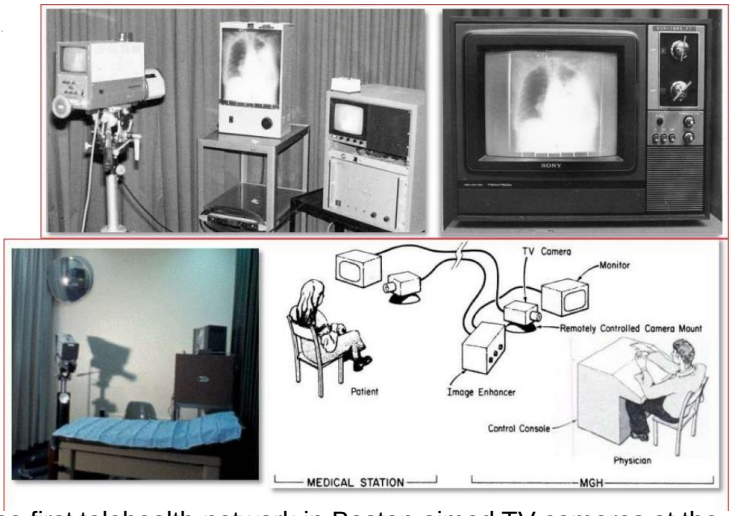


Modern telehealth systems look much like the first system between Mass General Hospital and Boston's Logan Airport.



**Organizations Aim to Standardize Telehealth Practices**
By Cori Turner and Megan Phillips on June 9, 2014
Posted in Children's Hospitals and Pediatric Providers, Hospitals & Health Systems, Physicians, Post-Acute Care & Nursing Facilities, Technology & Information Systems
http://www.intechopen.com/books/telemedicine/telemedicine-reducing-trauma-in-evaluating-abuse

## The First Telehealth System Network



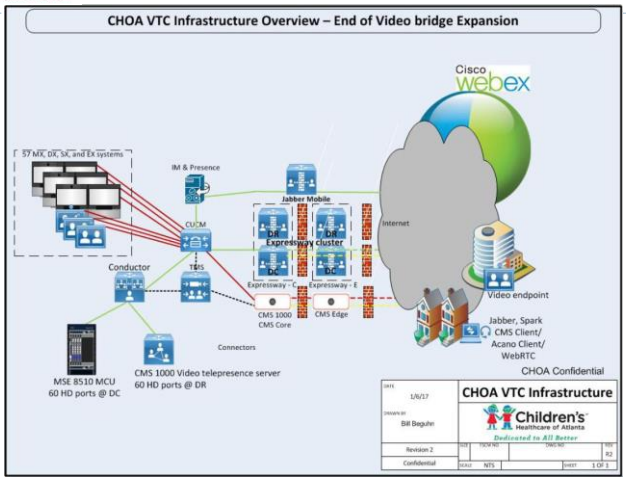

The first telehealth network in Boston aimed TV cameras at the doctor, patient and TV screens with clinical images.

32 Transforming Health Care with Telecommunications

**The Nuts and Bolts of Building a Telehealth Program**
Jonathan Neufeld, PhD
Georgia Partnership for Telehealth Conference
Savannah, Georgia
March 26, 2015
https://www.slideshare.net/gatelehealth/jonathan-neufeld-nuts-and-bolts

How 'A Stupid Idea' Gave Birth to Telemedicine
by Jay H. Sanders MD
December 30, 2015
https://www.medpagetoday.com/practicemanagement/informationtechnology/55457

## CHOA VTC: Video Capacity 2017




Telehealth systems today are more complex and technically sophisticated but share similarities with the first networks.



Bryan Larrieu, Director of IS and User Experience
Children's Healthcare of Atlanta

Children's Collaboration Growth 2016-2018
Georgia Partnership for Telehealth Annual Conference, March 2017.
http://www.gatelehealth.org/wp-content/uploads/2017/04/Day-2-7-Bryan-Larrieu-Choa-Collaboration-Growth-Overview.pdf

https://www.choa.org/
https://www.digchip.com/companies_news/photos/ca300.jpg

Cisco TelePresence MCU MSE 8510
https://www.cisco.com/c/en/us/products/conferencing/telepresence-mcu-mse-8510/index.html

Cisco TelePresence Video Communication Server (VCS)
https://www.cisco.com/c/en/us/products/unified-communications/telepresence-video-communication-server-vcs/index.html

Cisco Expressway Series version X8.6 Data Sheet
https://www.cisco.com/c/en/us/products/collateral/unified-

communications/expressway-series/datasheet-c78-730478.html

Cisco TelePresence Video Communication Server
Expressway

http://cdn2.hubspot.net/hub/160452/file-3903733182-pdf/docs/cisco-vcs-expressway-datasheet.pdf?t=1456853518000

Cisco DX Series
https://www.cisco.com/c/en/us/products/collaboration-endpoints/desktop-collaboration-experience-dx600-series/index.html

Cisco DX Series
https://www.cisco.com/c/dam/en/us/products/collateral/collaboration-endpoints/desktop-collaboration-experience-dx600-series/at-a-glance-c45-731845.pdf

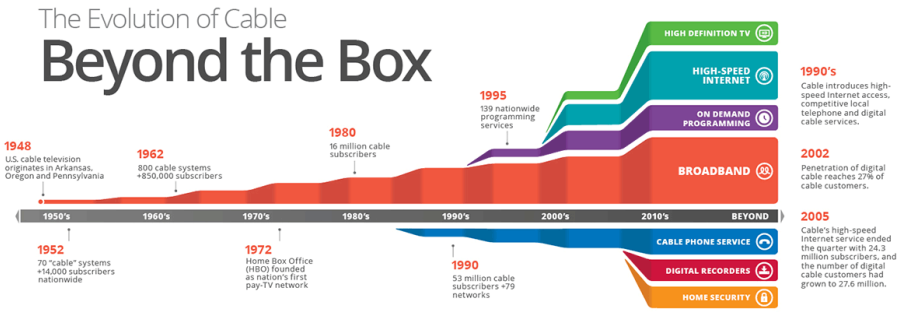
Cisco TelePresence System EX Series
https://www.cisco.com/c/en/us/products/collaboration-endpoints/telepresence-system-ex-series/index.html

Cisco TelePresence Server Data Sheet
https://www.cisco.com/c/en/us/products/collateral/conferencing/telepresence-server/datasheet-c78-736947.html

Cisco Meeting Server and Cisco Meeting App Data Sheet
https://www.cisco.com/c/en/us/products/collateral/conferencing/meeting-server/datasheet-c78-737519.html

CMS & Expressway Update
https://www.cisco.com/c/dam/global/da_dk/assets/training/seminaria-materials/CiscoVirtualUpdate-CiscoMeetingServerogExpressway.pdf

## Growth of Cable Television, 1948-2019




The development of cable television increased the throughput capacity of TV channels. The steady growth of broadband is a major factor in the development of new telehealth solutions.



**Timeline-lrg.gif**
**History of Cable**
https://www.calcable.org/learn/history-of-cable/

**The 1940s and 1950s**
Cable television originated in the United States almost simultaneously in Arkansas, Oregon and Pennsylvania in 1948 to enhance poor reception of over-the-air television signals in mountainous or geographically remote areas. “Community antennas” were erected on mountain tops or other high points, and homes were connected to the antenna towers to receive the broadcast signals.

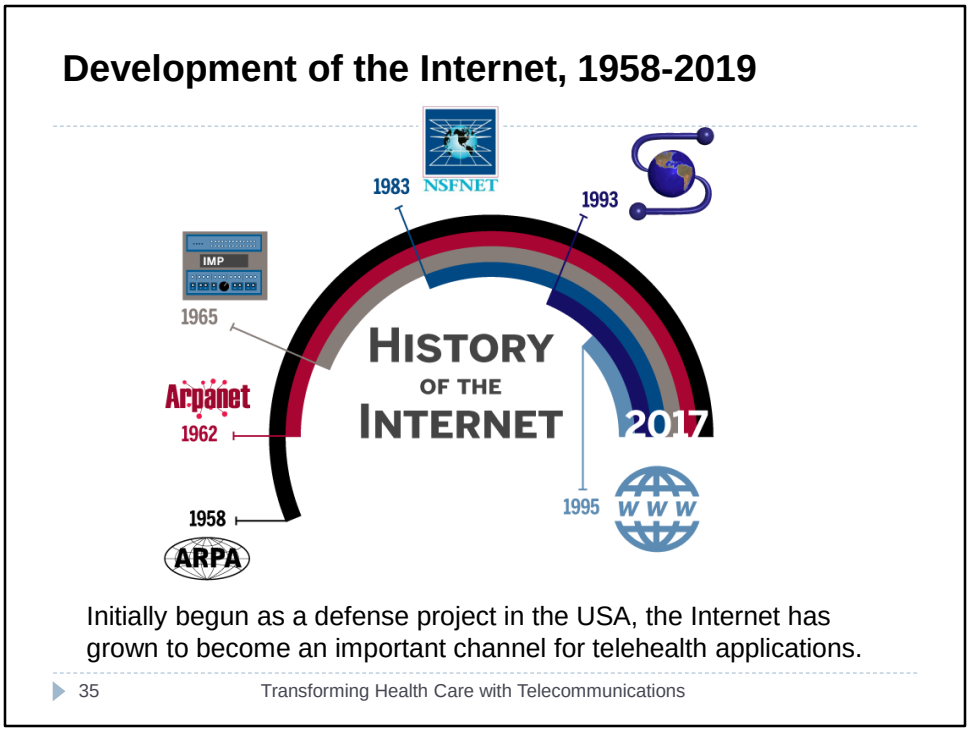
**The 1960s**
By 1962, almost 800 cable systems serving 850,000 subscribers were in business. Well-known corporate names like Westinghouse, TelePrompTer and Cox began investing in the business, complementing the efforts of early entrepreneurs like Bill Daniels, Martin Malarkey and Jack Kent Cooke.

**The 1970s**
In the early 1970s, the FCC continued its restrictive policies by enacting regulations that limited the ability of cable operators to offer movies, sporting events, and syndicated programming.

**The 1980s**
The 1984 Cable Act established a more favorable regulatory framework for the industry, stimulating investment in cable plant and programming on an unprecedented level.

**The 1990s**
In 1992, Congress responded to cable price increases and other market factors with legislation that once again hampered cable growth and opened heretofore "exclusive" cable programming to other competitive distribution technologies such as "wireless cable" and the emerging direct satellite broadcast (DBS) business.

**2000 and Beyond**
Arrival of the new millennium brought with it hopes and plans for acceleration of advanced services over cable's broadband networks.
As the new millennium got under way, cable companies began pilot testing video services that could change the way people watch television. Among these: video on demand, subscription video on demand, and interactive TV. The industry was proceeding cautiously in these arenas, because the cost of upgrading customer-premise equipment for compatibility with these services was substantial and required new business models that were both expansive and expensive.




**N_internetTime_1.png**
https://sciencenode.org/feature/a-brief-history-of-the-internet-.php

**A brief history of the internet**
February 7, 1958 was the day Secretary of Defense Neil McElroy signed Department of Defense Directive 5105.15. His signature launched the Advanced Research Projects Agency (ARPA), now known as the Defense Advanced Research Projects Agency (DARPA). The creation of the agency is an important moment in science history because it led to the creation of the internet we recognize today...

ARPA Network
The existing national defense network relied on telephone lines and wires that were susceptible to damage. In 1962, J.C.R. Licklider, a scientist from ARPA and MIT, suggested connecting computers to keep a communications network active in the US in the event of a nuclear attack.

This network came to be known as the ARPA Network, or ARPAnet. Packet switching made data transmission possible in 1965, and by 1969, military contractor Bolt, Beranek, and Newman (BBN) developed an early form of routing devices known as interface message processors (IMPs), which revolutionized data transmission...

"ARPAnet's transition to the open networking protocols TCP and IP in 1983

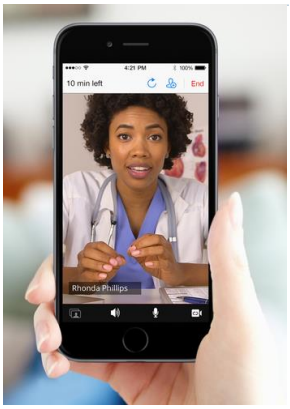
accelerated the already burgeoning spread of internetworking technology," says Stephen Wolff, principal scientist with Internet2. "When NSF's fledgling NSFNET adopted the same protocols, ARPAnet technology spread rapidly not only to university campuses across the USA to support the higher education community, but also to emergent Internet Service Providers to support commerce and industry."

The NSFNET eventually became a linked resource for the five supercomputing centers across the US, connecting researchers to regional networks, and then on to nearly 200 subsidiary networks. NSFNET took on the role of internet backbone across the US, with ARPAnet gradually phased out in 1990.

World-wide web
1989 saw a major step forward in internet communications. Tim Berners-Lee of the European Organization for Nuclear Research (CERN) created the hypertext transfer protocol (http), a standardization that gave diverse computer platforms the ability to access the same internet sites. For this reason, Berners-Lee is widely regarded as the father of the world wide web (www).
February 7, 1958 was the day Secretary of Defense Neil McElroy signed Department of Defense Directive 5105.15. His signature launched the Advanced Research Projects Agency (ARPA), now known as the Defense Advanced Research Projects Agency (DARPA). The creation of the agency is an important moment in science history because it led to the creation of the internet we recognize today...

**Who invented the internet?**
EVAN ANDREWS
https://www.history.com/news/who-invented-the-internet
The first workable prototype of the Internet came in the late 1960s with the creation of ARPANET, or the Advanced Research Projects Agency Network. Originally funded by the U.S. Department of Defense, ARPANET used packet switching to allow multiple computers to communicate on a single network. The technology continued to grow in the 1970s after scientists Robert Kahn and Vinton Cerf developed Transmission Control Protocol and Internet Protocol, or TCP/IP, a communications model that set standards for how data could be transmitted between multiple networks. ARPANET adopted TCP/IP on January 1, 1983, and from there researchers began to assemble the “network of networks” that became the modern Internet. The online world then took on a more recognizable form in 1990, when computer scientist Tim Berners-Lee invented the World Wide Web. While it’s often confused with the Internet itself, the web is actually just the most common means of accessing data online in the form of websites and hyperlinks. The web helped popularize the Internet among the public, and served as a crucial step in developing the vast trove of information that most of us now access on a daily basis.

## Wireless Cell Phones, 1979-2019




Cell phone technology has advance from the first clunky handsets of the 1980's to smaller, video-enabled devices that offer a newer, innovative approach to telehealth communications.



**motorola_dynatac.jpg**
http://content.time.com/time/specials/packages/article/0,28804,2023689_2023708_2023656,00.html
Motorola DynaTAC 8000x
By Peter HaMonday, Oct. 25, 2010

Dr. Martin Cooper made the first phone call over a cellular network in 1973, but it took an entire decade before the DynaTAC 8000x was sold as the first commercial handheld cellular phone in 1983. It weighed 1.75 lb., stood 13 in. high, stored 30 numbers, took 10 hours to recharge and cost $3,995.

**WomanOnCouchPhone_DrPhillips_2.jpg**
https://www.fiercehealthcare.com/tech/22-physicians-use-telehealth-and-burnout-may-drive-more-adoption-survey

**A Brief History of Mobile Communications**
http://www.winlab.rutgers.edu/~narayan/Course/Wireless_Revolution/vts%20article.pdf
Docket 18262
Finally, in 1968, with the UHF TV band continuing to fall far short of its original promise, the FCC opened Docket 18262, which proposed to allocate the upper

portion of this band to mobile systems for both private
and public uses. In 1971, the Bell System submitted a detailed proposal for a cellular system to be implemented in this band. [4] This began a decade-long battle among a diverse set of "stakeholders," many of whom had a strong interest in maintaining the status quo. Broadcasters did not want the frequencies reassigned. Existing manufacturers were threatened by the prospect of new systems, markets and competitors. Fleet operators wanted the spectrum for conventional uses. RCCs feared domination of a new, capital intensive service by the Bell System. In contrast, there was no lobby for the potential customers, who were generally unaware of the proposed new service.

The first "stored program controlled" central office switching machines were being introduced, providing a powerful central controller capable of the new functions, such as vehicle locating and call handoff, that would be required to allow calls in small cells. Integrated circuits offered the opportunity to create complex logic in a mobile radio at small size and low cost. Synthesizers were designed that would allow the mobile units to access hundreds of channels. Minicomputers offered a powerful option for control of the complex base stations, which were called "cell sites." The very long period of controversy even allowed for new technologies, like microprocessors, to emerge, evolve, and influence design choices. Given the many years that passed in litigation and confrontation, it is perhaps remarkable that the final design remained quite similar to the initial proposal.

Ultimately, in 1981, the FCC crafted a Final Order that paralleled earlier decisions on spectrum allocation for mobile systems. About half the spectrum was allocated for "trunked" systems, in which groups of 20 channels were used to provide conventional wide-area services such as fleet dispatch. The other half was allocated for cellular systems, once again to be divided equally between the local "wireline" telephone companies (primarily operated by the Bell System) and competing Radio Common Carriers. Rules were written to assure that cellular telephones could access either system, creating an open, compatible national service.

**Early Cellular Deployment**

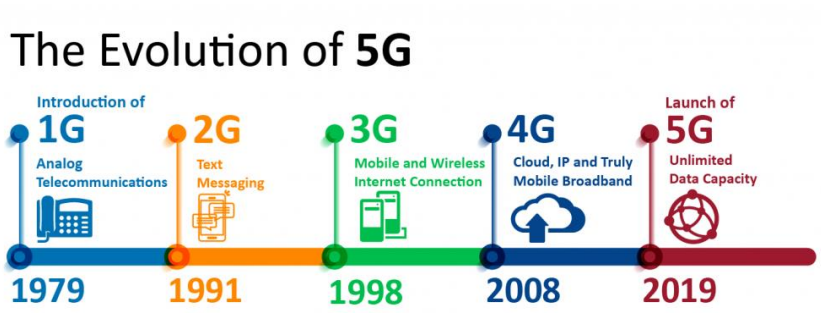
The first cellular system in the U.S. was put into operation by the Bell System in Chicago, in 1983, as part of a rapid deployment plan. Systems were also being installed in Japan and Europe, the beginning of a worldwide deployment that has now touched virtually every corner of the earth (in fact, the first Japanese system was installed in Tokyo in 1979, while the U.S. was still mired in regulatory and political delays). Ironically, at its moment of triumph after almost 40 years of dockets, litigation and development, the Bell System was split up in 1984, and the "telephone company systems" were deployed and operated by regional telephone companies. And in a further irony, when AT&T (parent of the Bell System) decided to enter the

cellular market a decade later, it was forced to do so by buying some of the RCC systems that had been created by Craig McCaw and others. Repeated mergers and sales have rendered the original distinctions created by the FCC meaningless.
Pocket Phones and the age of “Personal” Communication Cellular began as an “automobile” system, with relatively large trunk-mounted radios that were connected by cables to dashboard-mounted “control units.” Even as service began, however. “satchel” units were offered that provided a “portable” option. More significantly, Motorola soon introduced the “DynaTAC,” a 2-pound hand-held unit that was about the size of a brick, and could be carried in an attaché case. The evolution toward the pocket phone had begun.

**The Transition to Digital Cellular Systems**

The cellular systems deployed during the first decade of service used digital signals for control, but the voice signal was carried as an “analog” waveform. Even in the 1970s, however, there was an early debate as to the potential advantages of a fully digital system. At that time, it was concluded the technology was not ready for a fully digital cell phone that would achieve the same spectrum efficiency, voice quality and cost as the analog design, but by the late 1980s this was quickly changing. This primary reason was that voice processing technology, using digital signal processing (DSP) chips, had made dramatic advances. Good quality voice, once requiring 30-60,000 bits per second, was becoming possible at rates approaching 10,000 bits per second. This allowed three times as many

## Development Cell Phone Capacity




The development of broadband capacity is also evident in the increasing broadband capacity of wireless communications, leading to potential new innovations in telehealth solutions.



**5G-Timeline-Graphics-01-1-1024x385.png**
https://www.systemoneservices.com/5g-what-you-need-to-know/
What You Need to Know Right Now About 5G
By System One - February 12, 2019

**What is 5G and why is it important?**

Simply put, 5G is the 5th generation of mobile broadband. This next generation is necessary because the current 4G network structure is running out of space. 5G mitigates the problem of capacity by operating across three spectrums of communication low-band, mid-band and high-band or mmWave. The new 5G network reaches far beyond mobility to deliver truly unlimited data capacity and a fully interconnected world.

**What the 5G network means for wireless services?**

The 5G network provides low power wireless access that are closer to users. This enables smarter, lighter and more portable wireless, creating access for more locations. This will provide connectivity everywhere you go which will in turn allow for more automation. This new intelligence will observe, learn and predict user behaviors and provide real-time intuitive response and interactions. Other benefits of 5G include:

10 times more speed than current wireless connections and will be faster than home-based broadband

50 times less latency meaning no more buffering

1000 times more user capacity

## Staff of Global Partnership for Telehealth

An important fact to remember is that all telehealth operations rely on people – for technical, administrative and management support.

38 Transforming Health Care with Telecommunications

**Staff of Global Partnership for Telehealth**
Staff-Photo-e1554079630321.jpg
https://gpth.org/about-us/
https://gpth.org/our-story/

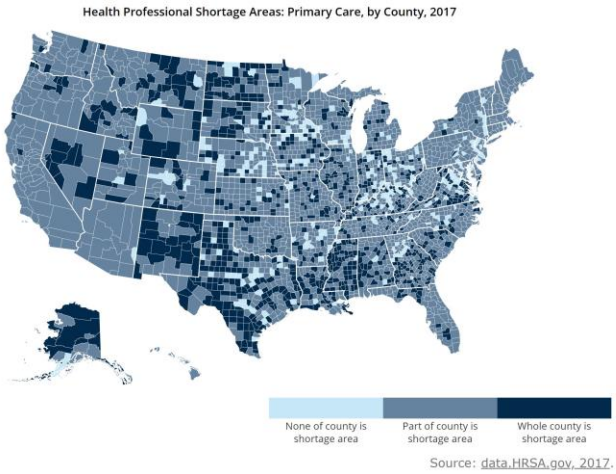
Global Partnership for Telehealth (GPT) is a nonprofit organization with a worldwide footprint that is based in Waycross, Georgia. GPT offers telehealth technology solutions and web-based platforms that brings much-needed healthcare resources to urban and rural communities with a focus on underserved areas. We work with school systems, hospitals, clinics, and health systems to connect people with health services.

The Georgia Partnership for Telehealth, Inc. was founded in 2007 to facilitate the emerging statewide network when WellPoint's three-year commitment came to an end.
The statewide collaboration among policy makers, healthcare providers and patients has led to a tremendous rate of success. Beginning with just 8 patient visits in 2006, GPT's Open Access Network now facilitates approximately 40,000 telehealth encounters annually. The network has grown to include over 650 clinical endpoints and facilitates collaboration between more than 150 specialists and healthcare providers that represent over 30 specialty practices.

## Health Care Needs in Remote and Rural Areas

- Primary care shortages in the USA
- Urban versus rural health care disparities
- Rural hospital closures
- Rural pharmacy closures
- Access to pharmacies in rural Florida
- The health care crisis in Florida

## Primary Care Shortages in Rural America




Most counties in America suffer from health care shortages, but rural counties are the most hard hit.



https://www.ruralhealthinfo.org/charts/5

**Health Professional Shortage Areas (HPSAs)**
https://bhw.hrsa.gov/shortage-designation/hpsas

Health Professional Shortage Areas (HPSAs) are designations that indicate health care provider shortages in:
Primary care;
Dental health; or
Mental health
These shortages may be geographic-, population-, or facility-based:

**Geographic Area**

A shortage of providers for the entire population within a defined geographic area.

**Population Groups**

A shortage of providers for a specific population group(s) within a defined geographic area (e.g., low income, migrant farmworkers, and other groups)

**Facilities**

**Other Facility (OFAC)**—public or non-profit private medical facilities serving a population or geographic area designated as a HPSA with a shortage of health providers

**Correctional Facility**—medium to maximum security federal and state

correctional institutions and youth detention facilities with a shortage of health providers

**State Mental Hospitals**—state or county hospitals with a shortage of psychiatric professionals (mental health designations only)

**Automatic Facility HPSAs (Auto HPSAs)**—a facility that is automatically designated as a HPSA by statute or through regulation without having to apply for a designation:

**Federally Qualified Health Centers (FQHCs)**—health centers that provide primary care to an underserved area or population, offer a sliding fee scale, provide comprehensive services, have an ongoing quality assurance program, and have a governing board of directors. All organizations receiving grants under Health Center Program Section 330 of the Public Health Service Act are FQHCs. Find additional information and requirements (PDF - 259 KB) from the Centers for Medicare and Medicaid Services (CMS).

**FQHC Look-A-Likes (LALs)**—LALS are community-based health care providers that meet the requirements of the HRSA Health Center Program, but do not receive Health Center Program funding.

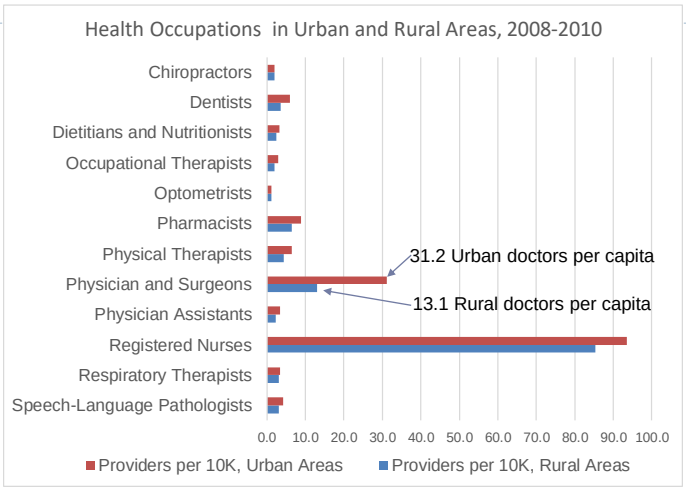
**Indian Health Facilities**—Federal Indian Health Service (IHS), Tribally-run, and Urban Indian health clinics that provide medical services to members of federally recognized Tribes and Alaska Natives.

**IHS and Tribal Hospitals**—Federal Indian Health Service (IHS), Tribally-run hospitals that provide inpatient and outpatient medical services to members of federally recognized Tribes and Alaska Natives.

**Dual-funded Community Health Centers/Tribal Clinics**—health centers that receive funding from Tribal entities and HRSA to provide medical services to members of federally recognized Tribes and Alaska Natives.

**CMS-Certified Rural Health Clinics (RHCs) that meet National Health Service Corps (NHSC) site requirements**—outpatient clinics located in non-urbanized areas that are certified as RHCs by CMS and meet NHSC Site requirementsincluding accepting Medicaid, CHIP, and providing services on a sliding fee scale.

## Urban versus Rural Health Care Disparities




There are more than twice as many doctors per capita in urban areas of America compared to rural America.

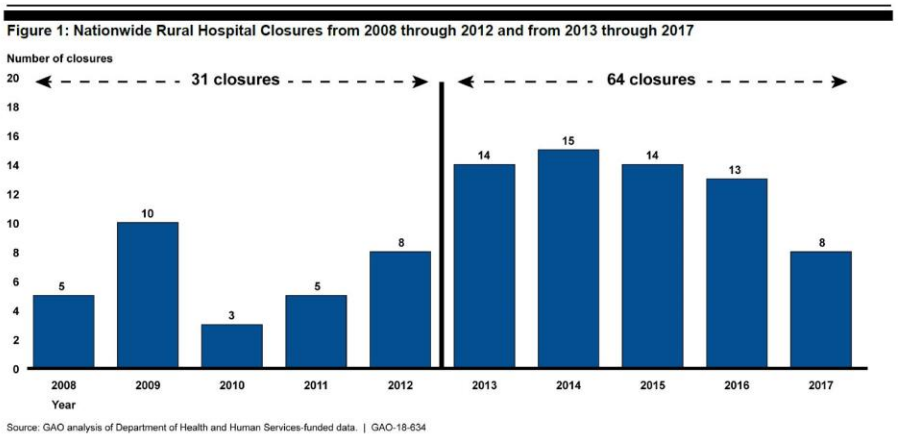
41 Transforming Health Care with Telecommunications

**National Center for Health Workforce Analysis**

Distribution of U.S. Health Care Providers Residing in Rural and Urban Areas
https://bhw.hrsa.gov/sites/default/files/bhw/nchwa/nchwafactsheet.pdf
KEY FINDINGS
 Among rural residents, there are more providers in occupations that require fewer years of education and training. Among urban residents, there are more providers in occupations that require greater years of education and training.
 Some sectors of the health care workforce have proportionately fewer providers living in rural areas,
regardless of amounts of education and training.
his fact sheet presents the supply and distribution of practitioners in 32 health occupations across urban and rural areas, based on their place of residence. Their distribution is examined through a comparison of the number of providers per capita residing in rural and urban areas. 1 The data presented in Table 1 show a very specific trend: among rural residents, there are proportionately more providers in occupations that require fewer years of education and training, than providers in occupations which require more years of education and training. For example, there are more EMTs and paramedics per capita residing in rural as opposed to urban areas, and more physicians and surgeons per capita residing in urban as opposed to rural areas. The greater representation of workers with less education and training living in rural areas is further evident within individual sectors of the health care workforce.

For example, among nursing occupations, although the combined number of registered nurses (RNs) and licensed practical and licensed vocational nurses (LPNs/LVNs) per capita is similar in rural and urban areas (117.1 and 114.1 per 10,000 people, respectively), rural areas have more LPNs/LVNs per capita, whereas urban areas have more RNs. Two sectors of the health care workforce, oral health and behavioral health, have proportionately fewer providers living in rural areas regardless of education and training levels. All three key oral health occupations – dentists, dental hygienists and dental assistants – show significantly lower per capita numbers of practitioners residing in rural areas. Similarly, there are fewer behavioral health practitioners (psychologists, social workers, and counselors) in rural areas. Though this analysis looks at patterns of residence for health care workers, it does not assess the appropriateness of either a particular provider-to-population ratio or the distribution of occupations and practitioners across urban and rural areas. Nor does the analysis draw conclusions as to why variations in distributions, between or within sectors of the health care workforce exist. Variance in the distribution across urban and rural areas may reflect individual choices or may reflect the fact that some providers are located in/near hospitals or other institutions that are not equally distributed. For some occupations, differences in staffing patterns, education and training opportunities, preferences for care, or dynamics of relationships between workers and their communities may be contributing factors among other potential influences.

## Rural Hospital Closures 2012-2017




Between 2012 and 2017, 95 rural hospitals across America ended operations, or reduced the health care services they offer.



**Number and Characteristics of Affected Hospitals and Contributing Factors**
United States Government Accountability Office
RURAL HOSPITAL CLOSURES
August 2018
Report to Congressional Requesters
https://www.gao.gov/assets/700/694125.pdf

Our analysis of data from the North Carolina rural health research center and CMS shows that, from 2013 through 2017, 64 of the approximately 2400 rural hospitals in the United States closed. 37
These 64 rural hospital closures represented the following:

- More than twice the number of rural hospitals that closed during the prior 5-year period. From 2008 through 2012, 31 rural hospitals closed (see fig. 1).

- More than the share of urban hospitals that closed. The 64 rural hospital closures from 2013 through 2017—approximately 3 percent of all rural hospitals in 2013—exceeded the 49 urban hospital closures during the same time period—approximately 2 percent of all urban hospitals in 2013.

- More than the number of rural hospitals that opened. The 42 rural hospitals closed from 2014 through 2016 exceeded the 3 rural hospitals opened during the

same time period.38

Approximately half of the rural hospitals that closed from 2013 through 2017—47 percent—ceased to provide any type of services. The remaining hospitals that closed during this period converted to other facility types, providing more limited or different services, such as urgent care, emergency care, outpatient care, or primary care.

Note: Hospitals were defined as general acute care hospitals in the United States, and a hospital
closure as a cessation of inpatient services. Rural was defined using the Federal Office of Rural
Health Policy's definition (areas in (i) a non-metropolitan county, (ii) a metropolitan county, but
with a Rural-Urban Commuting Area code of 4 or higher, or (iii) in one of 132 large and sparsely
populated census tracts with a Rural-Urban Commuting Area code of 2 or 3).Report to Congressional Requesters
https://www.gao.gov/assets/700/694125.pdf

Our analysis of data from the North Carolina rural health research center and CMS shows that, from 2013 through 2017, 64 of the approximately 2400 rural hospitals in the United States closed.37
These 64 rural hospital closures represented the following:

- More than twice the number of rural hospitals that closed during the prior 5-year period. From 2008 through 2012, 31 rural hospitals closed (see fig. 1).

- More than the share of urban hospitals that closed. The 64 rural hospital closures from 2013 through 2017—approximately 3 percent of all rural hospitals in 2013—exceeded the 49 urban hospital closures during the same time period—approximately 2 percent of all urban hospitals in 2013.

- More than the number of rural hospitals that opened. The 42 rural hospitals closed from 2014 through 2016 exceeded the 3 rural hospitals opened during the same time period.38

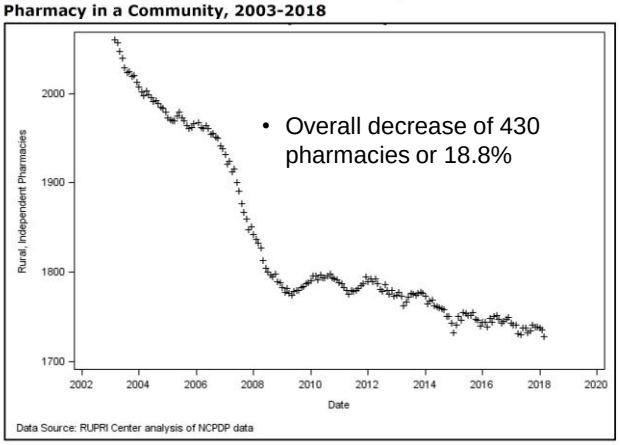
Approximately half of the rural hospitals that closed from 2013 through 2017—47 percent—ceased to provide any type of services. The remaining hospitals that closed during this period converted to other facility types, providing more limited or

different services, such as urgent care, emergency care, outpatient care, or primary care.

Note: Hospitals were defined as general acute care hospitals in the United States, and a hospital
closure as a cessation of inpatient services. Rural was defined using the Federal Office of Rural
Health Policy's definition (areas in (i) a non-metropolitan county, (ii) a metropolitan county, but
with a Rural-Urban Commuting Area code of 4 or higher, or (iii) in one of 132 large and sparsely
populated census tracts with a Rural-Urban Commuting Area code of 2 or 3).

## Pharmacy Closures in Rural America, 2003-2018

**Figure 2. Monthly Count of Rural Independently Owned Pharmacies That Were the Only Pharmacy in a Community, 2003-2018**




Since 2003, 430 independent rural pharmacies have closed - from 2,063 to 1,633. This represents a decrease of 18.8%, leaving many rural towns without a local pharmacy.



**Update: Independently Owned Pharmacy Closures in Rural America, 2003-2018**
RUPRI Center for Rural Health Policy Analysis
Rural Policy Brief No. 2018-2
JULY 2018
http://www.public-health.uiowa.edu/rupri/
Abiodun Salako, MPH; Fred Ullrich, BA; Keith J. Mueller, PhD

**Key Findings**

• Over the last 16 years, 1,231 independently owned rural pharmacies (16.1 percent) in the United States have closed. The most drastic decline occurred between 2007 and 2009. This decline has continued through 2018, although at a slower rate.
• 630 rural communities that had at least one retail (independent, chain, or franchise) pharmacy in March 2003 had no retail pharmacy in March 2018.

**Background**

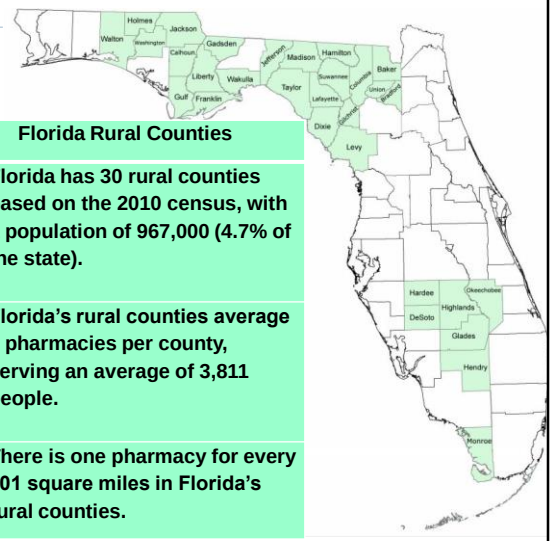
Independent pharmacies (i.e., those not affiliated with a chain or franchise) are a particular source of concern as they are more likely to be the sole source of pharmaceutical services in rural and other areas facing poor access to care.5 Furthermore, independent pharmacies are faced with particular financial challenges—such as low reimbursements stemming from a limited negotiating power and a greater reliance on drug sales as a primary source of revenue—that make them especially susceptible to closure.

**Results/Findings**

The number of independently owned rural pharmacies declined by 16.1 percent (from 7,624 to 6,393) between March 2003 and March 2018 (Figure 1). As described in our 2014 brief,2 the sharpest decline occurred between 2007 and 2009, with a 7.2 percent decline in the number of these pharmacies (from 7,383 in January 2007 to 6,853 in January 2009). While there was some fluctuation between January 2009 and March 2018, the overall trend in counts of rural independently owned pharmacies during that period was downward (from 6,853 to 6,393).

Similar to rural independent pharmacies, the number of sole community independent pharmacies has declined since 2003 (Figure 2). The steep decline in the number of these pharmacies flattened around mid-2009, but a steady decline has continued.

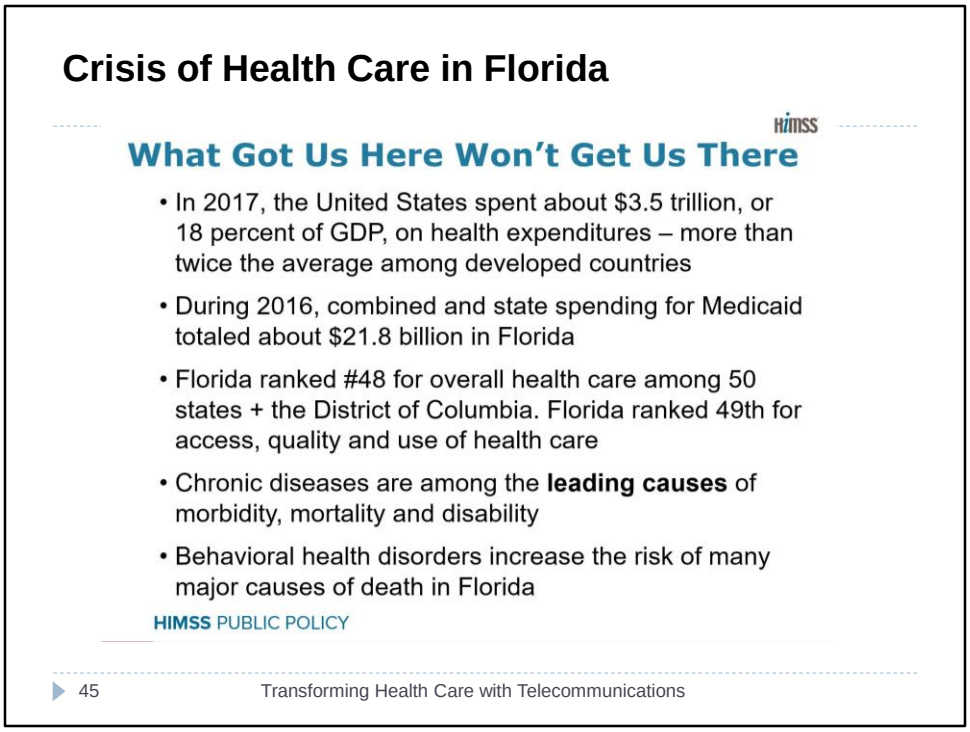
## Pharmacy Access in Urban and Rural Florida




| Florida Urban Counties | Florida Rural Counties |
|---|---|
| • Florida has 37 urban counties with a population of 19,500,000 (95.3% of the state). | • Florida has 30 rural counties based on the 2010 census, with a population of 967,000 (4.7% of the state). |
| • Florida's urban counties average 159 pharmacies per county, serving an average of 4,128 people. | • Florida's rural counties average 9 pharmacies per county, serving an average of 3,811 people. |
| • There is one pharmacy every 13 square miles in Florida's urban counties. | • There is one pharmacy for every 101 square miles in Florida's rural counties. |



**Calculations Based on Us Census and State of Florida datasets**




**Telehealth**
William Manzie
Administrative Director of Telehealth
Memorial Healthcare System
April 24, 2019

Florida ranks No. 48 in a new ranking of state health care systems (and the District of Columbia) published by The Commonwealth Fund, a private foundation that works to achieve better better health care access for low-income Americans

## Factors Driving the Implementation of Telehealth Services

- Federal Telehealth Programs
- State Telehealth Programs
- Florida Medicaid Telehealth Provisions
- National Associations Promoting Telehealth
- Examples of Florida Hospitals Promoting Telehealth


FEDERAL TELEHEALTH COMPENDIUM
Office of the National Coordinator for Health Information Technology Federal Office of Rural Health Policy - Health Resources and Services Administration
November 2016
https://www.healthit.gov/sites/default/files/federal_telehealth_compendium_final_122316.pdf

**Department of Agriculture** - The United States Department of Agriculture (USDA) administers telecommunications telehealth grants through two major programs:

**Department of Commerce** - The Department of Commerce supports telehealth primarily through grants to institutions for projects, and secondarily through collaborations with other federal agencies.

**Department of Defense** - Army Virtual Health (VH) connects patients and providers to health care across the world. The Navy Virtual Health Program develops and coordinates global telehealth to support remote, Fleet and deployed forces to ensure continuity of care for uniform service members and DoD beneficiaries.

**Department of Health and Human Services**

Agency for Healthcare Research and Quality (AHRQ), Division of Health Information Technology - AHRQ funds telehealth projects that vary from telewound care, provider-to-provider training, determinants of successful telemedicine implementations, and direct patient support through messaging or mobile applications.

Health Resources and Services Administration, Federal Office of Rural Health Policy

(FORHP) - The FORHP supports the delivery of telehealth services which may include technical assistance, demonstration and evaluations of programs, network expansions as well as delivery of cost-effective telehealth services for rural and medically underserved areas and populations.
Centers for Disease Control and Prevention - The National Center for Chronic Disease Prevention and Health Promotion (NCCDPHP) is conducting an environmental scan of telemedicine networks and programs that provide telemedicine component for hypertension management services in the U.S along with a systematic review of the effectiveness of telemedicine hypertension management among disparate populations.

**Centers for Medicare & Medicaid Services** - Centers for Medicaid and CHIP Services (CMCS): Under the Medicaid Program, states have the option/flexibility to determine whether (or not) to cover telemedicine. States decide whether to provide telehealth and the type of telehealth services they will authorize for payment.
**National Institutes of Health (NIH),** National Library of Medicine (NLM) - NLM conducts and funds telehealth research by assessing telemedicine technologies and their clinical application. In addition, NLM funds investigator-initiated telemedicine research grants.
**Indian Health Service, Division of Behavioral Health** - Telehealth provides an alternative means of accessing health services for many American Indian and Alaska Natives populations that may reside in isolated communities. The Indian Health Service (IHS) beneficiaries receive telehealth services through various telecommunications systems that are set up, in part, through federal interagency collaborations and private networks.
**Substance Abuse and Mental Health Services Administration (SAMHSA)** - SAMHSA supports grants to implement innovative and efficient models of care that leverage telehealth to improve the quality and availability of medication-assisted treatment services for people with substance use disorders within their state.
**Department of Justice** - Federal Bureau of Prisons, Health Services Division - Internally, the Federal Bureau of Prisons (FBOP) provides telehealth consultation services by FBOP staff to outlying institutions in the following specialties: dermatology, dietitian, pharmacy (diabetes and psychiatric collaborative practice agreements), psychiatry, and social work.
**Department of Veterans Affairs**
**Office of Connected Health** - The Office of Connected Care brings VA digital technology to Veterans and health care professionals, extending access to care beyond the traditional office visit. Through virtual technology, VA
**Rural Health** - Department of Veterans Affairs (VA) Telehealth Services uses health informatics, disease management and telehealth technologies to target care and case management to improve access to care, improving the health of veterans. On
**Federal Communication Commission** - This program provides funding to eligible

health care providers for telecommunications and broadband services necessary for the provision of health care. The goal of the program is to improve the quality of health care available to patients in rural communities by ensuring that eligible health care providers have access to telecommunications and broadband services, which enables the provision of telehealth and telemedicine services. The

**Federal Trade Commission** - The FTC continues to consider telehealth in its state-level advocacy on proposed legislation and rules. In addition, pursuant to its consumer protection mission, the agency has oversight of various privacy and security matters that may arise in the telehealth and health app context.

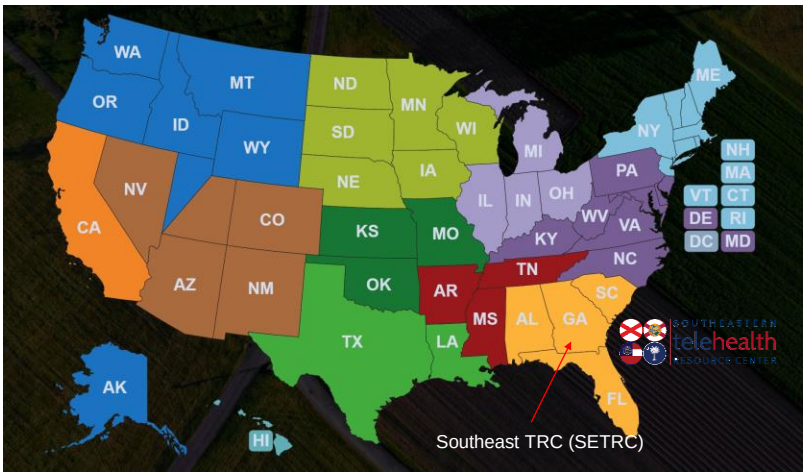
**National Aeronautics and Space Agency** - National Aeronautics and Space Agency (NASA) has integrated the concepts and tools of telemedicine and telehealth into the delivery of healthcare in support of its astronauts during space flight. In

**National Science Foundation** - NSF administers SCH program, in which several NIH institutes participate, whose goal is to accelerate the development and use of innovative approaches that would support the much needed transformation of healthcare from reactive and hospital-centered to preventive, proactive, evidence-based, person-centered and focused on well-being rather than disease. The SCH program funds some projects focused on telehealth.

# HRSA Telehealth Program Areas

| Telehealth Guidance Resources | Topical Resources |
|---|---|
| Telehealth Overview | Broadband Funding |
| Telehealth Policy | Disaster Relief |
| | HIPAA |
| **Technical Assistance Resources** | Mobile Health (mHealth) |
| Telehealth Reimbursement and Funding | Remote Patient Monitoring |
| Telehealth Technologies and Vendors | Telebehavioral Health |
| Telehealth Licensure | |
| Telehealth Research | **Training** |
| Federal Telehealth Programs | Telehealth Training |
| Telehealth Provider Directory | Bureau of Primary Health Care |
| Telehealth Reports and Policy Briefs | |
| Telehealth Resource Centers | **HRSA Bureau Specific Resources** |
| Telehealth Conferences | HIV/AIDS Bureau |
| Telehealth Distribution Lists and Webinars | Maternal Child Health Bureau |
| | Federal Office of Rural Health Policy |
| | Bureau of Health Workforce |

## HRSA Funded Telehealth Resource Centers



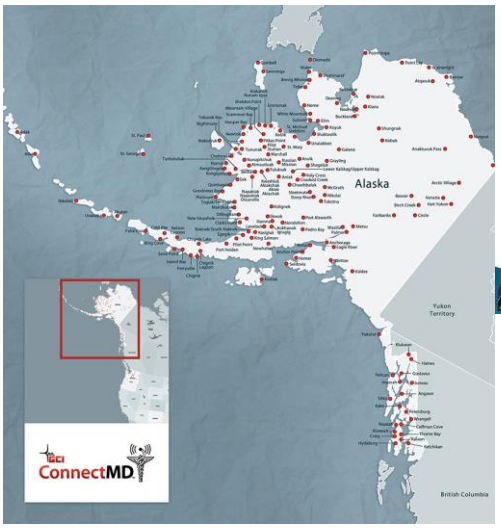

49 Transforming Health Care with Telecommunications

**HRSA Telehealth Resource Centers**
Telehealth Resource Center Website
National Consortium of TRCs
Center for Connected Health Policy (CCHP)
Great Plains TRC (GpTRC)
Heartland TRC (HTRC)
MidAtlantic TRC (MATRC)
Northeast TRC (NETRC)
Northwest Regional TRC (NRTRC)
Pacific Basin TRC (PBTRC)
South Central TRC (SCTRC)
Southeast TRC (SETRC)
Telehealth Technology Assessment Center (TTAC)
TexLa TRC (TexLA)
Upper Midwest TRC (UMTRC)

**Southeastern Telehealth Resource Center (SETRC)**
The SETRC is one of 14 Telehealth Resource Centers ( 12 Regional and 2 National) funded by the federal Office for the Advancement of Telehealth through a grant program to provide support and guidance to Telehealth programs. Our mission is to serve as a focal point for advancing the effective use of Telehealth and support access to Telehealth services in rural and under served communities in the southeastern

region of the United States. We have extensive Telehealth experience and can provide services, resources and tools to both developing and operating programs.
https://www.setrc.us/

## Telehealth Programs in Alaska




**AFHCAN MISSION**

To improve access to health care for federal beneficiaries in Alaska through sustainable telehealth systems

**A**laska
**F**ederal
**H**ealth
**C**are
**A**ccess
**N**etwork

The telehealth network in Alaska reaches hospitals, clinics and Native American villages across the state.

50 Transforming Health Care with Telecommunications

**GCItelehealth-header.jpg**
https://www.ncta.com/whats-new/gci-makes-telehealth-as-easy-as-regular-healthcare-in-rural-alaska
GCI Healthcare's ConnectMD private meet-me network is a telehealth program that connects over 250 healthcare facilities, hospitals and clinics supporting telehealth for Alaskans who live beyond reach of the state's major hubs. GCI has built this endeavor over the past 17 years, investing $300 million to provide critical services including internet connectivity, video conferencing, security and privacy support, and additional measures to transform telehealth into just "health" — a normal part of everyday business, explained Joe Furrer, director of GCI Healthcare. And it's built in a way that makes collaboration easy among healthcare facilities across the state.

**Outcomes and Impacts of Telehealth in Alaska: An 8 Year Retrospective**
Stewart Ferguson Ph.D. Acting CIO, ANTHC Director of Telehealth
John Kokesh MDChief, Dept. of Otolaryngology, Alaska Native Medical Center

- Alaska is 1st in land mass, with 1,420 miles (N-S), 2,400 miles (E-W), 33,900 miles of shoreline - more than all of the contiguous states combined.
- National Travel and Safety Board (NTSB) reported 436 commuter aircraft accidents in Alaska from1990-2004 (2.8 accidents a month) - accounting for 36% of all commuter aircraft accidents in the US.
- 47th in road miles 75% Alaskan communities unconnected by a road to a hospital. 25 of these have no airport.

- Population density is 1.1 persons/mile - 70 times smaller than the national average.
- 49% of all physicians in Alaska are primary care physicians (2002 data). U.S. average is 28%.
- Alaska is 48th in “doctors to residents” ratio - 65% are located in Anchorage.
- Shortages in many specialties - 59% of the state’s residents are in medically underserved areas.
- Historically, Alaskan health care has incorporated a public health mission and primary care focus, and is less reliant on specialty acute care than other parts of the country.

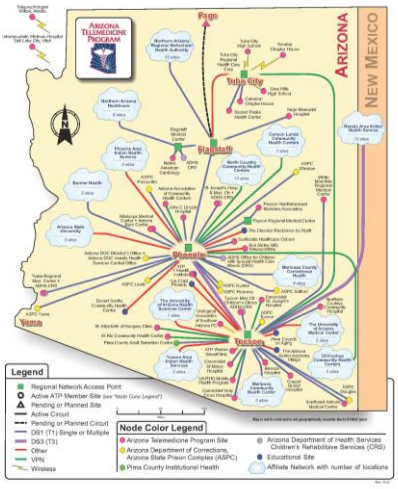
Alaska Department of Health and Social Services
Division of Public Health
http://dhss.alaska.gov/dph/HealthPlanning/Pages/telehealth/default.aspx

**Mission**

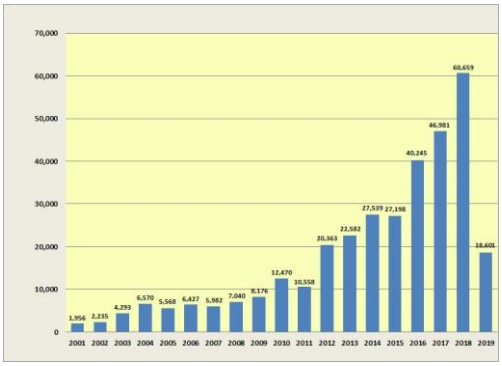
To improve access to health care in underserved Alaskan communities through the expansion and adoption of telehealth initiatives.

## Telehealth Programs in Arizona

ARIZONA TELEMEDICINE NETWORK




Arizona Regional Behavioral Health Authority




The telehealth networks in Arizona provide telemedicine services, including an expanding program of telebehavioral health.

51 Transforming Health Care with Telecommunications

**The Arizona Telemedicine Program**
ATP Map 2012.jpg
https://telemedicine.arizona.edu/applications-network/sites
The Arizona Telemedicine Program is a large, multidisciplinary, university-based program that provides telemedicine services, distance learning, informatics training, and telemedicine technology assessment capabilities to communities throughout Arizona, the sixth largest state in the United States, in square miles. The program has succeeded in creating partnerships among a wide variety of not-for-profit and profit healthcare organizations, and has created new interagency relationships within the state government. Functioning as a "virtual corporation," the Arizona Telemedicine Program is creating new paradigms for healthcare delivery over the information superhighway. The program is recognized as one of the premier programs at the University of Arizona College of Medicine, and has received numerous awards at the national level for its research and innovations.

**Q12019ClinicalSessions2001-2019.jpg**

**Scheduled member services over NARBHAnet**
(provider-patient meetings by calendar year)
**January 1, 2001 - March 31, 2019**

Estimated total scheduled patient services over NARBHAnet,

November 1996 - March 2019 - **341,579**

NARBHA's "NARBHAnet" telemedicine network is the winner of the 2010 Excellence in Health IT Award from the National Council for Community Behavioral Healthcare.

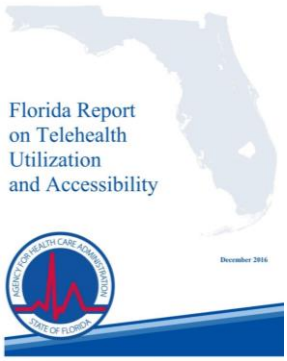
- In calendar year 2010, the NARBHA telemedicine network saved over 175,000 miles of driving and over 3,100 hours of drive time by 20 psychiatric providers.
- This saved 71 tons of CO2 from being added to earth's atmosphere.
- This doesn't include all the staff who save countless hours of drive time throughout the 62,000 square miles of Northern Arizona by using the telemedicine network for meetings.

http://www.rbha.net/

## Telehealth in Florida

Telehealth Advisory Council: *Florida Report on Telehealth Utilization and Accessibility*

- 44.8% of Florida hospitals offer telehealth services.
- The most frequent use cases of telehealth in Florida include:
  - Neurology (including stroke care)
  - Home health/patient monitoring
  - Primary care
  - Behavioral health
  - Radiology
- Financial barriers are the most frequently reported obstacles during implementation and operation of telehealth programs.
- Many providers reported a lack of knowledge about telehealth services.




52 Transforming Health Care with Telecommunications

**Florida Report on Telehealth Utilization and Accessibility**
Telehealth Advisory Council
December 2016
https://ahca.myflorida.com/SCHS/telehealth/docs/Telehealth_Report_Final.pdf

The new telehealth law also creates a Telehealth Advisory Council for the purpose of making recommendations to the Governor and the Legislature.

Highlighted findings contained within this initial report include:
• Utilization of telehealth is expanding in Florida and nationally, both in terms of the variety of applications and use cases as well as patient volume and demand.
• Nearly half (44.8%) of Florida hospitals responding to AHCA's telehealth survey indicated that telehealth services are available through their facilities.
• The most frequent use cases of telehealth reported by licensed health care facilities in Florida include: neurology (including stroke care), home health/patient monitoring, primary care, behavioral health, and radiology.
• Nearly half (44%) of home health agencies responding to the Agency's survey indicated using telehealth to assist with remote patient monitoring.
• Benefits reported from health care facilities and professionals offering telehealth services include improved convenience for both patients and providers, improved efficiencies, and improved patient care outcomes.
• Financial barriers are the most frequently reported obstacles among health care

facilities and providers during both implementation and ongoing operations of telehealth programs.

• Due to multiple and often conflicting definitions of telehealth at every level (Federal, State, and among private payers and policymakers), there is significant uncertainty across stakeholder groups regarding types of services and activities that may qualify as telehealth for the purposes of coverage and reimbursement.

• Despite great technological advances over time in the field of Health Information Technology, including Electronic Health Records (EHR) systems and Health Information Exchange (HIE) networks, there remain significant challenges with interoperability between providers across the state and nationally, making it difficult for health care professionals to obtain adequate medical history and clinical information at the time they are treating a patient. These gaps in interoperability were cited by survey respondents as a common barrier to the development and implementation of telehealth programs.

• Research and survey findings indicate that few providers have achieved a financial Return on Investment (ROI) attributable to the implementation of telehealth services; although some examples do exist.

• Many providers reported a lack of detailed knowledge about telehealth services, and indicated interest in gaining access to evidence-based best practices, educational resources, or training opportunities associated with telehealth.

## Florida Medicaid Requires Telehealth


The 2019 Florida Medicaid Managed Care Contract requires health plans to offer telemedicine services.

The Managed Care Plan shall provide coverage for services provided through telemedicine, when appropriate, for services covered under this Contract, to the same extent the services would be covered if provided through a face-to-face (in-person) encounter with a practitioner.

The Managed Care Plan agrees to not be more restrictive in the coverage requirements for services provided through telemedicine than those established for services provided in-person.

The Managed Care Plan shall ensure the enrollee has a choice of whether to access services through a face-to-face or telemedicine encounter.



See: http://www.fdhc.state.fl.us/Medicaid/statewide_mc/plans_FY18-23.shtml
https://ahca.myflorida.com/Medicaid/statewide_mc/model_health_FY18-23.shtml
https://ahca.myflorida.com/Medicaid/statewide_mc/pdf/Contracts/2019-02-01/Attachment_II-Core_Contract_Provisions_2019-02-01.pdf


### American Telemedicine Association

**As the only organization completely focused on advancing telehealth, the ATA is working to change the way the world thinks about healthcare.**

We are committed to ensuring that everyone has access to safe, affordable, and effective care when and where they need it, enabling the system to do more good for more people.

https://www.americantelemed.org/

## American Hospital Association

The American Hospital Association (AHA) is the national organization that represents and serves all types of hospitals, health care networks, and their patients and communities. Nearly 5,000 hospitals, health care systems, networks, other providers of care and 43,000 individual members come together to form the AHA.

https://www.aha.org

Explore Telehealth Topics

AHA Telehealth Research

AHA Telehealth Factsheet, February 2019 Telehealth: Delivering the Right Care, at the Right Place, at the Right Time: Case Examples of AHA Members in Action, July 2017

Telehealth: Helping Hospitals Deliver Cost-Effective Care, April 2016 Realizing the Promise of Telehealth: Understa...

Use of Telehealth in Hospitals and Health Systems—Members in Action

Taking Telehealth to the Next Level Nationally: Telehealth Centers of Excellence - Medical University of South Carolina (MUSC) and University of Mississippi Medical Center (UMMC) (February 2018) Telehealth: Delivering the Right Care, at the Right Place, at the Right Time: Case Examp...

Federal Telehealth Advocacy

Improving Patient Care Through Telehealth Access Federal Legislative and Regulatory Initiatives Telehealth Fact Sheet [PDF] Fact Sheet: Telehealth February 2019 AHA Testimonies and Public Comments [PDF] Letter to the FCC on Promoting Telehealth in Rural Areas February...

State Telehealth Advocacy

Expanding Access to Telehealth State Legislative and Regulatory Initiatives National Telehealth Policy Resource Center Federal and State Legislative and Regulatory Tracking System http://cchpca.org/laws/pending/state Access to proposed federal and state legislative and regulatory in...

State and Regional Telehealth Networks

Expanding Access to Telehealth State and Regional Telehealth Networks Arizona Telemedicine Program Arkansas e-Link University of Arkansas Nurse: Telehealth Turns Underserved Communities into Wired Populations California Telehealth Network Colorado Telehealth Network Delaware Tel...

External Telehealth Research and Resources

Establishing the Value of Telehealth External Research - 2017 Creating a Framework to Support Measure Development for Telehealth. National Quality Forum. (August 2017) Telehealth Private Payer Laws: Impact and Issues. Milbank Memorial Fund. (August 2017) The Virtual House Call: A ...

### Health Information Management Systems Society

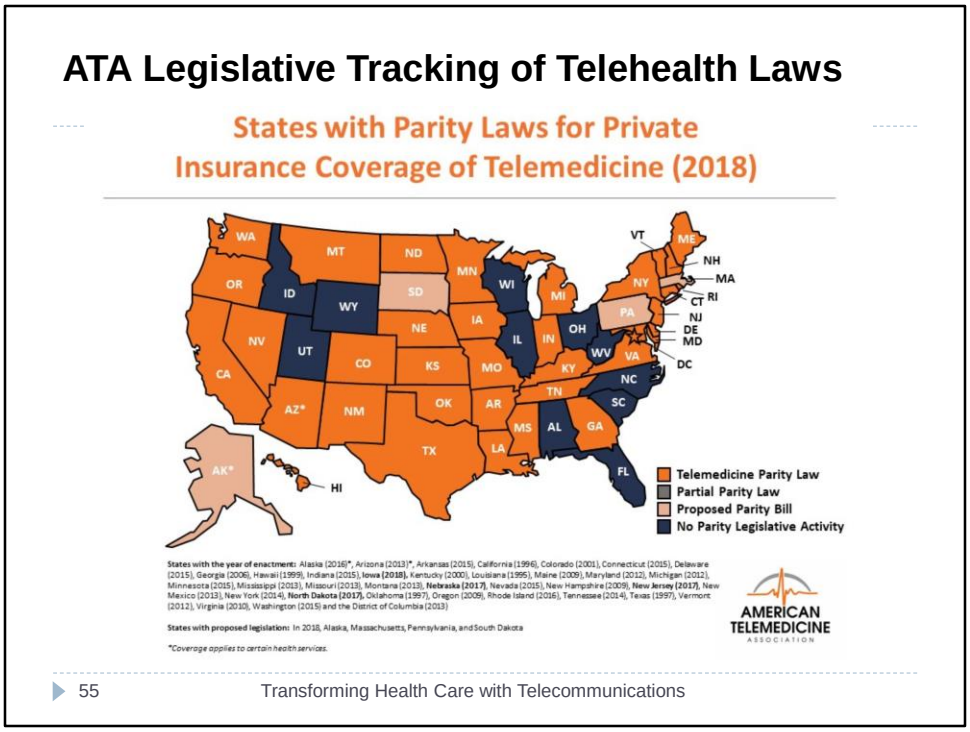
https://www.himss.org/

**HIMSS** is a global, cause-based, not-for-profit organization focused on better health through information and technology. HIMSS leads efforts to optimize health engagements and care outcomes using information technology.

### American Health Information Management Association

AHIMA is the premier association of health information management (HIM) professionals worldwide. Serving 52 affiliated component state associations and more than 103,000 health information professionals, AHIMA is the leading authority for "HIM knowledge" and widely respected for its esteemed credentials and rigorous professional education and training.

http://www.ahima.org/

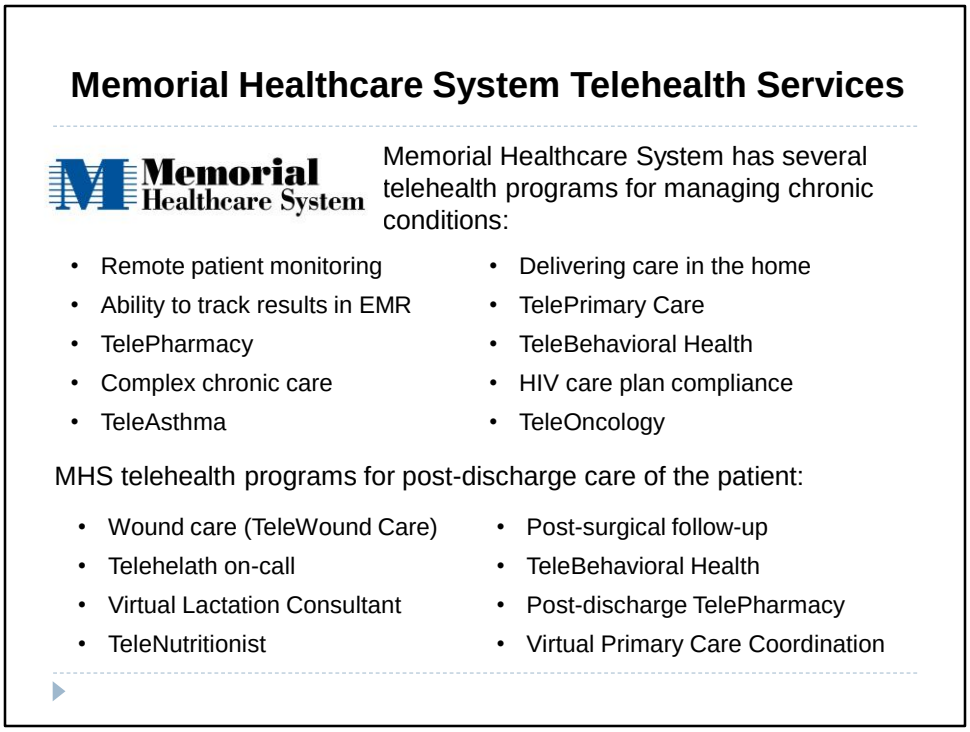



**State Legislative & Regulatory Trackers**

http://legacy.americantelemed.org/policy-page/state-policy-resource-center

ATA's State Policy Resource Center monitors telemedicine state policies, identifies and works to resolve barriers to state-level telemedicine use, and provides policy technical assistance to the ATA members and state policymakers.

The ATA State Telemedicine Legislative & Regulatory Trackers provides live, up-to-the-minute updates pertaining to telemedicine policy. Each listing includes details on a bill or rule, the corresponding sponsor, language, status and scheduled hearings. This is a benefit available to current ATA members exclusively. Click the buttons below to access the ATA Legislative and Regulatory Trackers.




Telehealth
William Manzie
Administrative Director of Telehealth
Memorial Healthcare System
April 24, 2019

*Chronic disease self management can improve quality of life and health care costs.
*Chronic diseases are largely preventable by engaging in healthy behaviors.
*We should no longer be in the business of only treating people when they are sick, we should also be in the business of keeping patients healthy
TALK ABOUT THE PROGRAMS THAT ARE CHANGING PEOPLES BEHAVIORS

## Telehealth at Baptist Health South Florida

Baptist Health South Florida

Baptist Health South Florida offers an e-ICU that oversees 147 ICU and step-down beds.

- Telehealth equipment is linked to a remote monitoring site.
- Computers monitor patients' medical needs.
- The Tele-ICU intensivist communicates over video and two-way audio

Other telehealth programs:

- Home health programs and remote monitoring
- Telepsychology on cruise lines
- ePrimary care
- Virtual Urgent Care
- eSitter program
- **ePharmacy services**

57 Telepharmacy: Path to the Telehealth Future

https://baptisthealth.net/en/health-services/eicu-lifeguard/pages/default.aspx

**What is eICU LifeGuard?**
When you or your loved one is in critical condition, nothing can replace the personal care given by the doctors and nurses in the intensive care unit (ICU). An important member of the ICU team is an intensivist, a doctor who specializes in the treatment of critically ill patients. Because an intensivist is involved with the care of all ICU patients, it has been impossible for that doctor to be at every patient's bedside all of the time, until now.

The equipment used to monitor a patient's condition is linked to the remote monitoring site, where computers are specifically programmed for each patient's medical needs. Computer software monitors vital signs, shows lab results and X-rays, and details a patient's medical history. The data makes a "virtual" medical chart, providing a complete picture of a patient's condition as it changes — minute by minute — without pages and pages of documents to flip through.

When needed, the LifeGuard intensivist and critical care nurses talk with a patient and bedside nurse using video and two-way audio and medical information equipment installed in Baptist Health's critical care rooms. The eICU LifeGuard system can help doctors determine the best course of treatment. A real-time video can be turned on as needed to zoom in on a patient for a closer assessment. The lens is so

powerful that it can be used to examine a patient's pupils. For privacy, a bell sounds in the room to let the patient and staff know when the video camera is on.

With Baptist Health's eICU LifeGuard, you have the comfort of knowing that nurses and doctors in the ICU are backed by highly trained critical care professionals working tirelessly behind the scenes to ensure the best possible care.

**eICU LifeGuard means:**

Improved patient safety: Electronic monitoring can detect small, subtle changes in a patient's condition. Physicians and nurses at the command center alert the ICU team in the hospital immediately so that they can intervene and proactively treat problems before serious complications develop.

Improved patient recovery: Studies have documented a 27 percent reduction in deaths and a 14 percent reduction in the length of stay for ICU patients monitored electronically. Fewer complications means better outcomes.

Improved patient care: eICU LifeGuard is a safety net for critically ill patients.
The technology allows specialists to continuously monitor and manage ICU patients.

## Factors Constraining Telehealth Services

- Research on barriers to telehealth implementation
- Challenges of telehealth startups in Florida
- Regulatory barriers to telehealth

## Barriers to the Use of Telehealth

Researchers identified 33 telehealth barriers with a frequency of 100 occurrences across 30 articles.

| Barrier | % of Mentions |
|---|---|
| Technically challenged staff | 11% |
| Resistance to change | 8% |
| Cost | 8% |
| Reimbursement | 5% |
| Age of patient | 5% |
| Level of education of patient | 5% |
| All other barriers | 4% or less |



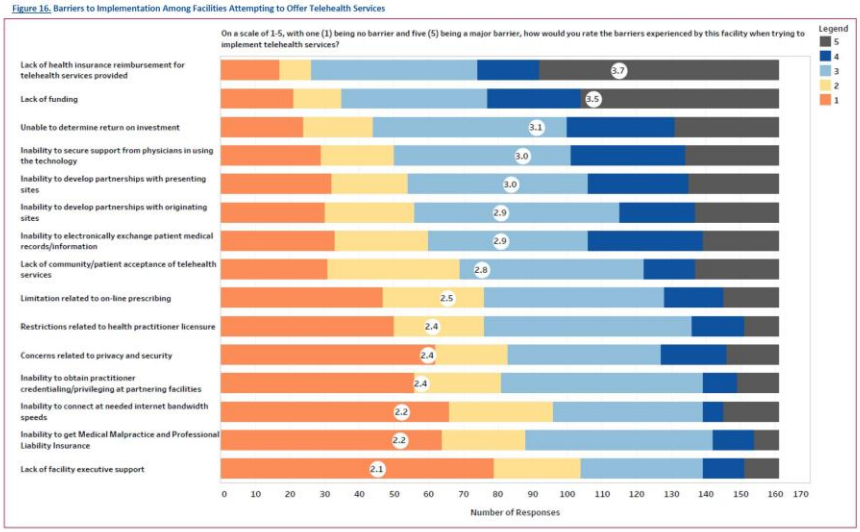
**Evaluating barriers to adopting telemedicine worldwide: A systematic review**
Clemens Scott Kruse, Priyanka Karem, Kelli Shifflett, Lokesh Vegi, Karuna Ravi, and Matthew Brooks
J Telemed Telecare. 2018 Jan; 24(1): 4–12.
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5768250/ 3/16

**Objective**
The objective of this study is to examine the various challenges faced in implementing telemedicine
among several different countries to identify any new trends compared with similar studies from
several years past. What are the principal barriers to the adoption of telemedicine? What countries are
experiencing barriers? Which barriers are unique to some groups in the healthcare industry? Is there
public policy that could help overcome these barriers? Our review aims to record the most frequently
faced challenges and the efforts to overcome those challenges.

**Methods**
We conducted a systematic review of the literature by extracting data from the Cumulative Index of

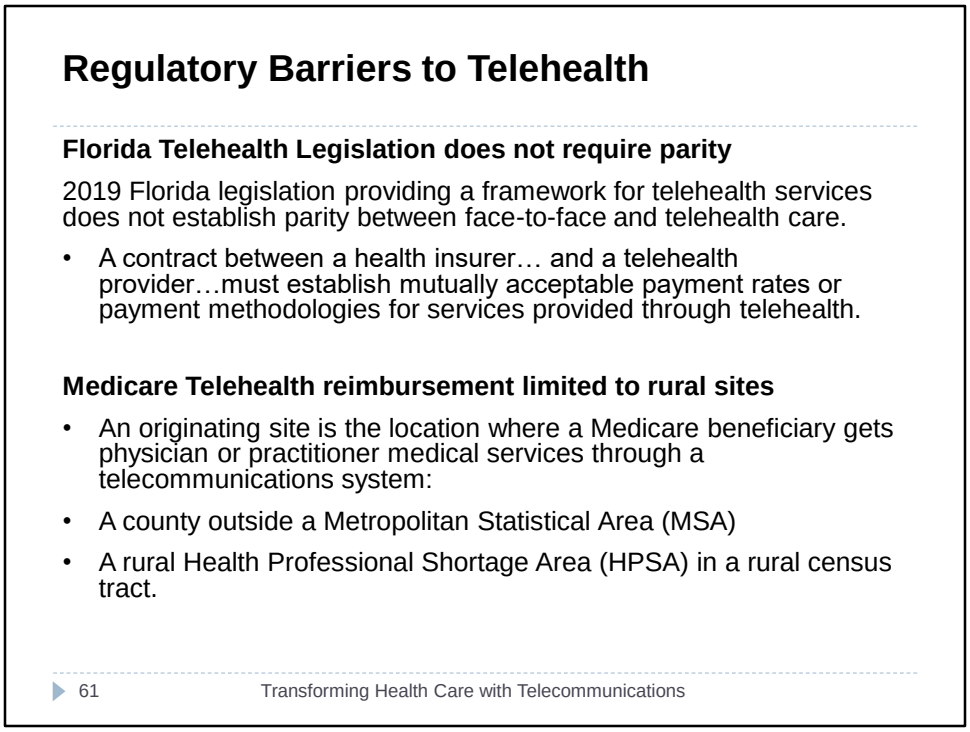
Nursing and Allied Health Literature (CINAHL) and PubMed (MEDLINE) research databases.
Searches were performed between 6 and 10 June 2016. The keywords used for the research in this
study were barriers, adoption, implementation, telemedicine, tele care, telecare, tele health, telehealth,
mobile health, mHealth, m-Health, eHealth, and e-Health. The terms used in the searches were slightly
different between the two databases, primarily because the two databases index differently. Figure 1
illustrates the search process with inclusion and exclusion criteria. As depicted, the exact search phrase
in CINAHL was '((Barriers) AND (Adoption OR Implementation)) AND ("Telemedicine" OR "Tele
care" OR "Mobile health" OR "eHealth" OR "mhealth" OR "m-health" OR "e-health" OR
"Telecommunication" OR "telehealth" OR "Self care")'. In PubMed (MEDLINE), all the sub-terms
used in the CINAHL search were already nested under telemedicine in the PubMed Medical Subject
Headings (MeSH) of telemedicine. Boolean operators and quotation marks were used in the search
process to capture variations in the lexicon and to identify the desired intersection of telemedicine and
barriers.

## Challenges of Telehealth in Florida






**Florida Report on Telehealth Utilization and Accessibility**
Telehealth Advisory Council
December 2016
https://ahca.myflorida.com/SCHS/telehealth/docs/Telehealth_Report_Final.pdf




Florida Legislature
CS/CS/HB 23
An act relating to telehealth
https://www.flsenate.gov/Session/Bill/2019/23/BillText/er/PDF

Medicare
TELEHEALTH SERVICES

https://www.cms.gov/Outreach-and-Education/Medicare-Learning-Network-MLN/MLNProducts/downloads/TelehealthSrvcsfctsht.pdf?utm_campaign=2a178f351b-EMAIL_CAMPAIGN_2019_04_19_08_59&utm_term=0_ae00b0e89a-2a178f351b-353229765&utm_content=90024810&utm_medium=social&utm_source=facebook&hss_channel=fbp-372451882894317

An originating site is the location where a Medicare beneficiary gets physician or practitioner medical services through a telecommunications system. The beneficiary must go to the originating site for the services located in either:
- A county outside a Metropolitan Statistical Area (MSA)
- A rural Health Professional Shortage Area (HPSA) in a rural census tract.

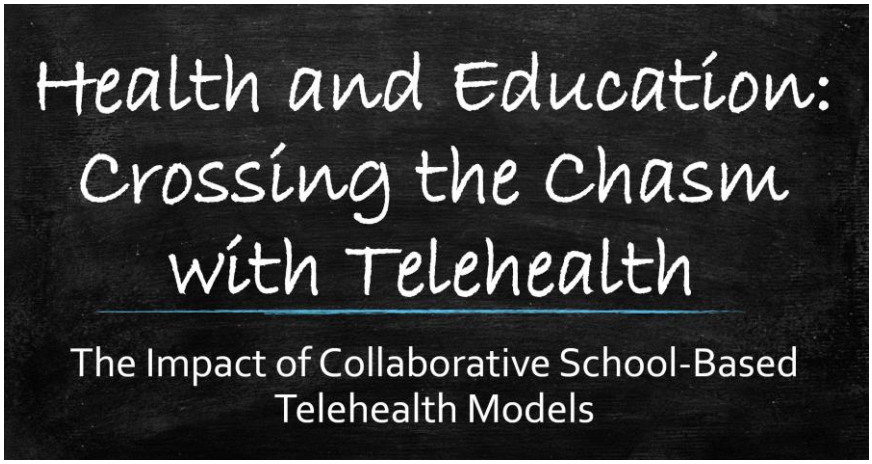
The Health Resources and Services Administration (HRSA) decides HPSAs, and the Census Bureau decides MSAs. To see a potential Medicare telehealth originating site's

payment eligibility, go to HRSA's Medicare Telehealth Payment Eligibility Analyzer. Providers qualify as originating sites, regardless of location, if they were participating in a Federal telemedicine demonstration project approved by (or getting funding from) the U.S. Department of Health & Human Services as of December 31, 2000.

## Examples of Telehealth Projects

- Synchronous – School-based Telehealth
- Asynchronous – Teleradiology for Maternal Fetal Monitoring
- Remote Patient Monitoring – Preventing 30-day Readmission
- Mobile Health - Telerehabilitation

## Synchronous Example - School Telehealth




Loren Nix, Director of School-Based Telehealth, Global Partnership for Telehealth
10th Annual Global Partnership for Telehealth Conference, March 2019



https://gpth.org/the-10th-annual-global-partnership-for-telehealth-conference/

## School-based Telehealth Equipment







https://gpth.org/the-10th-annual-global-partnership-for-telehealth-conference/

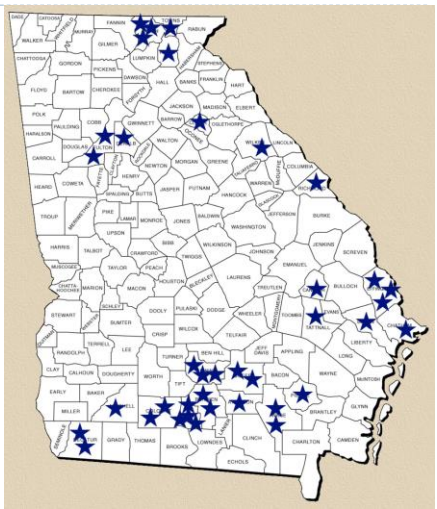
## Clinical Application of Telehealth Technology



https://gpth.org/the-10th-annual-global-partnership-for-telehealth-conference/

## Georgia Telehealth Schools and Clinics

Georgia Telehealth Schools

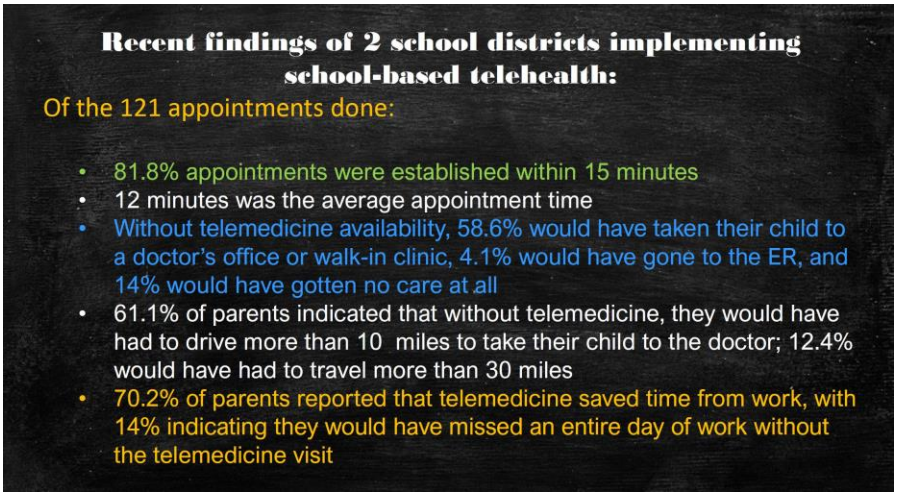


Telehealth Health Care Providers

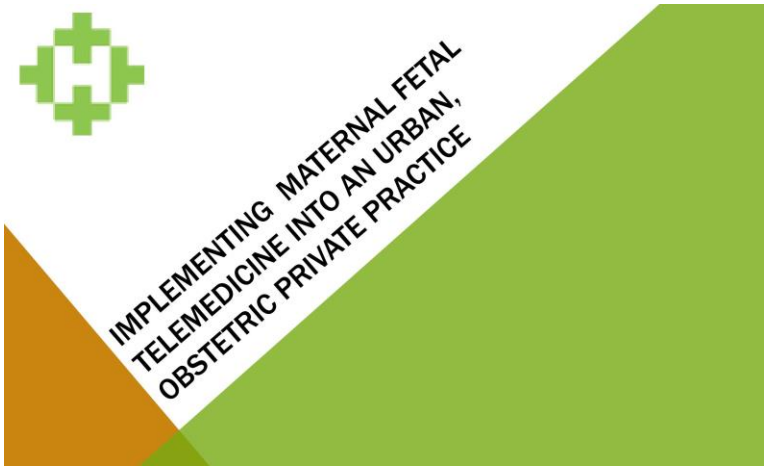


https://gpth.org/the-10th-annual-global-partnership-for-telehealth-conference/

## Findings from School-based Telehealth



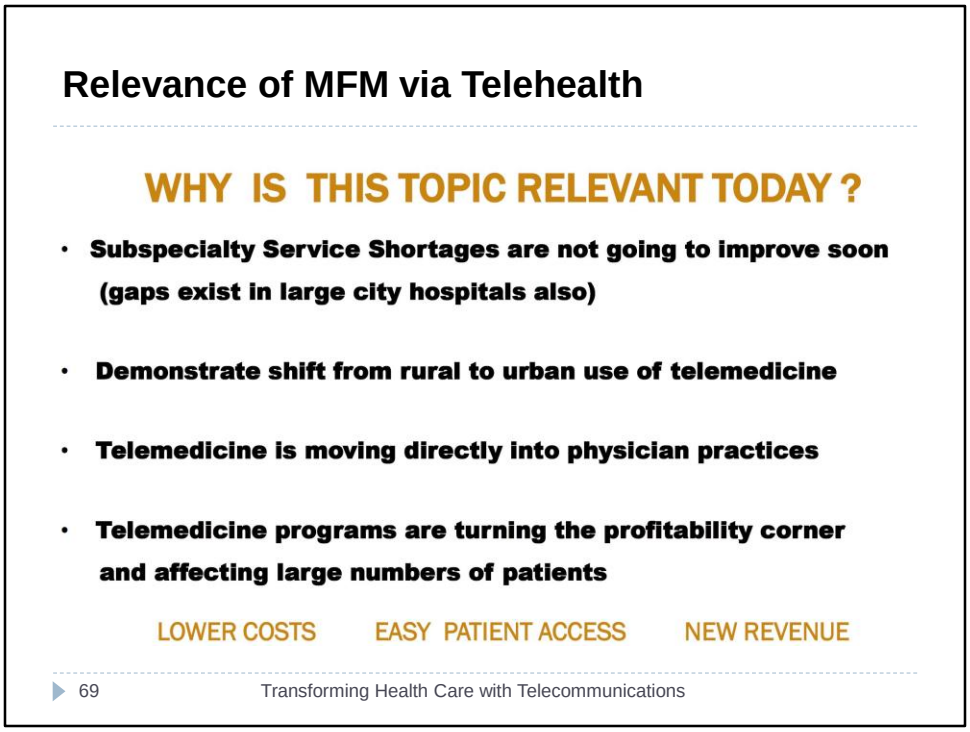
## Asynchronous Example – Maternal Fetal Monitoring




Tanya Mack & Dr. Ann Patterson, PhD
8th Annual Global Partnership for Telehealth Conference, March 2017



Slides care of Global Partnership for Telehealth
In personal file of Dr. Christopher Sullivan




Slides care of Global Partnership for Telehealth
In personal file of Dr. Christopher Sullivan

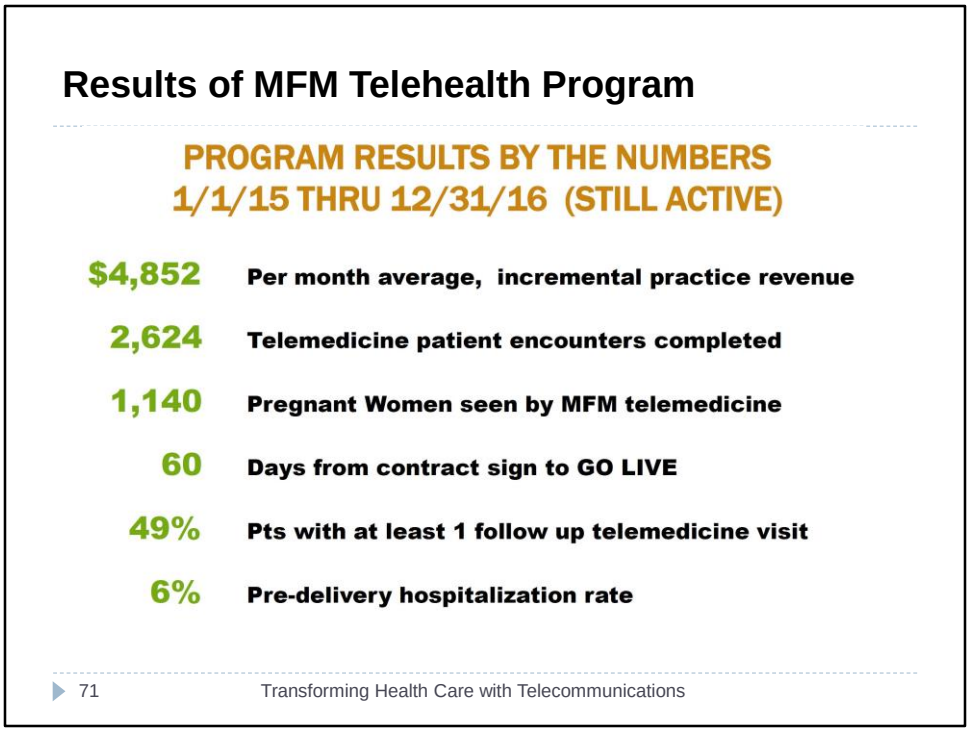
## Image Quality of Obstetric Teleradiology

We are able to obtain exceptional image quality, including 3D Imaging, from thousands of miles away.

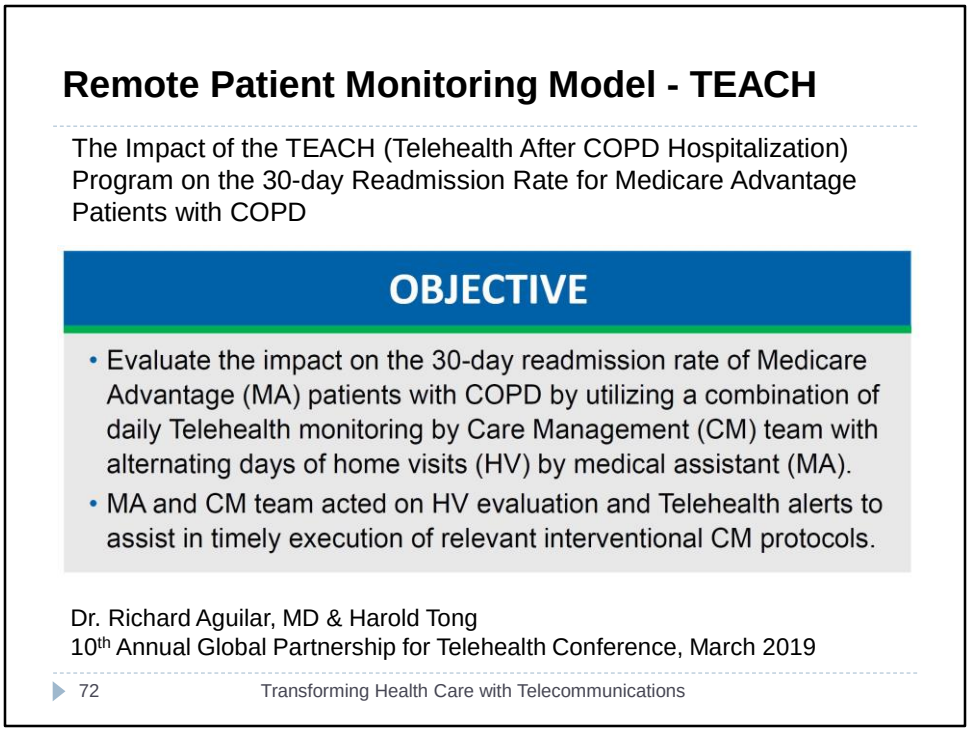
Guess: How big is this baby?
You will be amazed by today's telemedicine technology tools.



Slides care of Global Partnership for Telehealth
In personal file of Dr. Christopher Sullivan

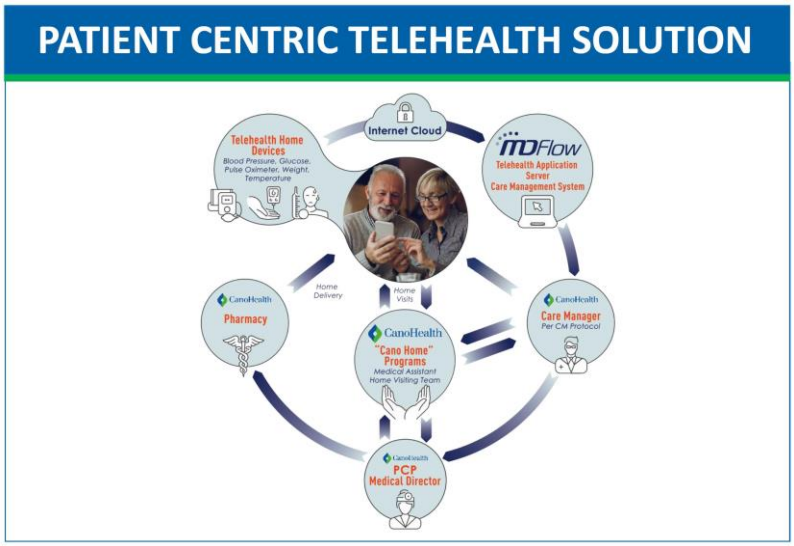



Slides care of Global Partnership for Telehealth
In personal file of Dr. Christopher Sullivan




**The Impact of the *TEACH*(Telehealth After COPD Hospitalization) *Program* on the 30-day Readmission Rate for Medicare Advantage Patients with COPD**
10th Annual Global Partnership for Telehealth Conference March 20-22 Cordele, GA
https://gpth.org/the-10th-annual-global-partnership-for-telehealth-conference/

## TEACH Telehealth Model




73 Transforming Health Care with Telecommunications

**The Impact of the *TEACH*(Telehealth After COPD Hospitalization) *Program* on the 30-day Readmission Rate for Medicare Advantage Patients with COPD**
10th Annual Global Partnership for Telehealth Conference March 20-22 Cordele, GA
https://gpth.org/the-10th-annual-global-partnership-for-telehealth-conference/

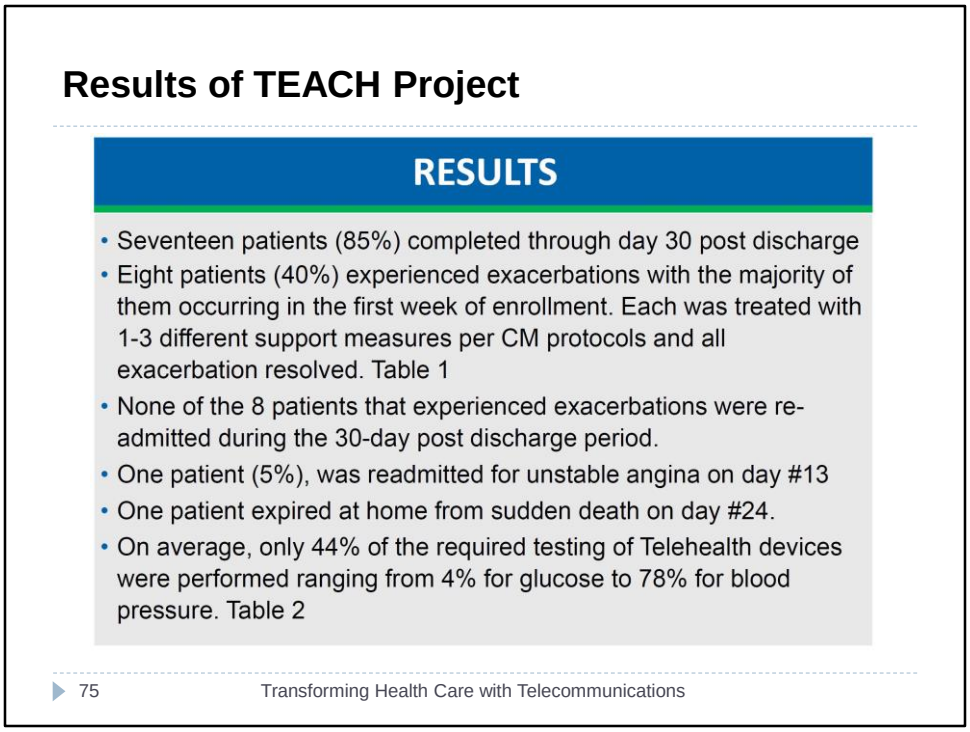
## Telehealth Monitoring in the TEACH Project

**TELEHEALTH DATA Table 2**

| Patient # | # of Days Enrolled | Total Data Points Expected Per Device | DATA POINTS COLLECTED PER DEVICE | | | | Total Data Points Collected Per Patient | Average Data Points Collected Per Day |
|---|---|---|---|---|---|---|---|---|
| | | | Blood Pressure | Glucose | Pulse Ox | Weight | | |
| 1 | 30 | 60 | 14 | 7 | 12 | 14 | 47 | 1.6 |
| 2 | 30 | 60 | 71 | 6 | 46 | 45 | 168 | 5.6 |
| 3 | 30 | 60 | 62 | 6 | 36 | 32 | 136 | 4.5 |
| 4 | 30 | 60 | 56 | 3 | 24 | 169 | 252 | 8.4 |
| 5 | 31 | 60 | 28 | 0 | 11 | 13 | 52 | 1.7 |
| 6 | 30 | 60 | 38 | 0 | 6 | 27 | 71 | 2.4 |
| 7 | 30 | 60 | 44 | 3 | 11 | 28 | 86 | 2.9 |
| 8 | 30 | 60 | 29 | 1 | 11 | 2 | 43 | 1.4 |
| 9 | 10 | 20 | 69 | 2 | 52 | 22 | 145 | 14.5 |
| 10 | 30 | 60 | 41 | 1 | 10 | 22 | 74 | 2.5 |
| 11 | 30 | 60 | 74 | 0 | 6 | 40 | 120 | 4.0 |
| 12 | 30 | 60 | 35 | 1 | 17 | 63 | 116 | 3.9 |
| 13 | 29 | 58 | 29 | 1 | 20 | 13 | 63 | 2.2 |
| 14 | 30 | 60 | 27 | 1 | 9 | 38 | 75 | 2.5 |
| 15 | 29 | 58 | 59 | 2 | 30 | 11 | 102 | 3.5 |
| 16 | 24 | 48 | 90 | 1 | 50 | 77 | 218 | 9.1 |
| 17 | 31 | 60 | 15 | 2 | 15 | 18 | 50 | 1.6 |
| 18 | 25 | 50 | 42 | 2 | 10 | 4 | 58 | 2.3 |
| 19 | 32 | 60 | 28 | 0 | 26 | 6 | 60 | 1.9 |
| 20 | 30 | 60 | 45 | 2 | 11 | 7 | 65 | 2.2 |
| TOTAL | | 1,134 | 896 | 41 | 413 | 651 | 2,001 | x̄ 3.9/day |
| % Of Total Expected Data Points | | | 78% | 4% | 36% | 56% | 44% | |

74 Transforming Health Care with Telecommunications

**The Impact of the *TEACH*(Telehealth After COPD Hospitalization) *Program* on the 30-day Readmission Rate for Medicare Advantage Patients with COPD**
10th Annual Global Partnership for Telehealth Conference March 20-22 Cordele, GA
https://gpth.org/the-10th-annual-global-partnership-for-telehealth-conference/




**The Impact of the *TEACH*(Telehealth After COPD Hospitalization) *Program* on the 30-day Readmission Rate for Medicare Advantage Patients with COPD**
10th Annual Global Partnership for Telehealth Conference March 20-22 Cordele, GA
https://gpth.org/the-10th-annual-global-partnership-for-telehealth-conference/

## Mobile Health Example - Telerehabilitation

**Teleneurology and Rehabilitation for Mobility Disorders**

*Heather Barksdale PT, DPT & Paul Hoffman, MD*

UFHealth
UNIVERSITY OF FLORIDA HEALTH

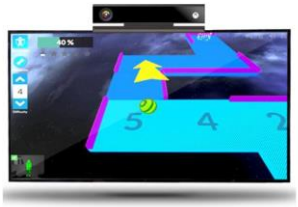
Dr. Paul Hoffman, MD & Heather Barksdale, PT, DPT
5th Annual FloridaTelehealth Summit, November 2018

76 Transforming Health Care with Telecommunications

Heather Barksdale PT DPT
Paul M. Hoffman M.D.
University of Florida College of Medicine and UF Health Jacksonville, Florida
Teleneurology and Rehabilitation for Mobility Disorders
https://www.setrc.us/news-events/events/5th-annual-florida-telehealth-summit-2018.html

## Telerehabilitation Approach

- Subjects are participating in web based home rehabilitation training using the Jintronix software platform and Kinect tracking system.
- Televideo visits are made weekly by physical therapists to review progress and recommended exercises
- Subjects are assigned between 6-10 exercises to perform as part of web based home program with modifications as needed throughout sessions





Heather Barksdale PT DPT
Paul M. Hoffman M.D.
University of Florida College of Medicine and UF Health Jacksonville, Florida
Teleneurology and Rehabilitation for Mobility Disorders
https://www.setrc.us/news-events/events/5th-annual-florida-telehealth-summit-2018.html

## Telerehabilitation Comparison

### Improved access to specialized neuro-rehabilitation guided exercise programs

- **Traditional outpatient PT model:** 2x/week x 8 weeks= 16 guided sessions
- **Telerehab model:** Recommend at least 2x/week- available to patient throughout the week, all times of the day including weekends

Sample duration chart- subject 4


UFHealth
UNIVERSITY OF FLORIDA HEALTH

Started average of 10 minutes of exercise/day

Ended average of 40 minutes of exercise/day

78 Transforming Health Care with Telecommunications

Heather Barksdale PT DPT
Paul M. Hoffman M.D.
University of Florida College of Medicine and UF Health Jacksonville, Florida
Teleneurology and Rehabilitation for Mobility Disorders
https://www.setrc.us/news-events/events/5th-annual-florida-telehealth-summit-2018.html

## Telerehabilitation Travel Savings

### Reduction in travel cost and travel time for the patient

01: Lake City: 62.7 miles, 65 minutes
02: Panama City Beach: 280 miles, 4 hours & 20 minutes
03: New Port Richey: 195 miles, 3hours & 26 minutes
04: Savannah: 138 miles, 2 hours & 10 minutes
05: Tallahassee: 171 miles, 2 hours & 36 minutes

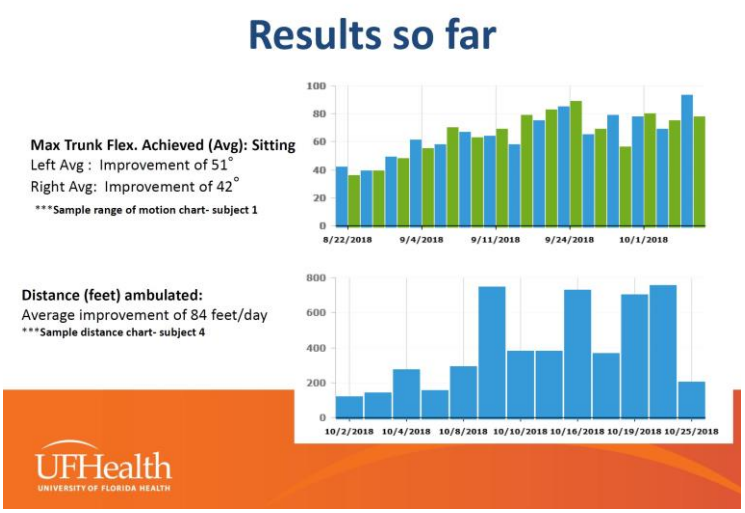

| One round trip visit mileage cost (53.5 cents/mile) | | | | |
|---|---|---|---|---|
| $67.09 | $299.60 | $208.65 | $147.66 | $182.97 |
| **Mileage cost for 8 visits** | | | | |
| $536.72 | $1498.00 | $1669.20 | $1181.28 | $914.85 |

UFHealth UNIVERSITY OF FLORIDA HEALTH → $5800.00

79 Transforming Health Care with Telecommunications

Heather Barksdale PT DPT
Paul M. Hoffman M.D.
University of Florida College of Medicine and UF Health Jacksonville, Florida
Teleneurology and Rehabilitation for Mobility Disorders
https://www.setrc.us/news-events/events/5th-annual-florida-telehealth-summit-2018.html

## Telerehabilitation Results






**The Impact of the *TEACH*(Telehealth After COPD Hospitalization) *Program* on the 30-day Readmission Rate for Medicare Advantage Patients with COPD**
10th Annual Global Partnership for Telehealth Conference March 20-22 Cordele, GA
https://gpth.org/the-10th-annual-global-partnership-for-telehealth-conference/

## Some Conclusions on the Future of Telehealth

## Some Concluding Remarks

Despite the increasing sophistication of telecommunication technologies and speed of transmission, many health care providers do not take advantage of these advances to change the way they practice medicine. For example:

- The use of interactive, synchronous video has changed little since the first telehealth network in 1967 – or 1925.
- The use of asynchronous store and forward technologies to read digital files corresponds to the same approach that radiologists use to read x-rays today.

The changes brought about by telehealth technologies occur in:

- The geographic reach that opens up greater access to health care services in remote, rural and isolated urban areas.
- The speed of communications that allows for faster turnaround of diagnostic results.



**The Impact of the *TEACH*(Telehealth After COPD Hospitalization) *Program* on the 30-day Readmission Rate for Medicare Advantage Patients with COPD**
10th Annual Global Partnership for Telehealth Conference March 20-22 Cordele, GA
https://gpth.org/the-10th-annual-global-partnership-for-telehealth-conference/

## Telehealth Innovation in Clinical Devices

The unique innovations in telecommunication technologies appear to be arising with clinical devices that are attached to the interactive telehealth network.

The use of these devices extends the reach of a physician by offering better resolution and measurement for clinical and diagnostic decisions. These include:

- Digital otoscope
- Digital stethoscope
- Digital vital sign monitors
- Digital retinal cameras
- Digital electrocardiograms
- Digital spirometer
- Digital dental cameras



**The Impact of the *TEACH*(Telehealth After COPD Hospitalization) *Program* on the 30-day Readmission Rate for Medicare Advantage Patients with COPD**
10th Annual Global Partnership for Telehealth Conference March 20-22 Cordele, GA
https://gpth.org/the-10th-annual-global-partnership-for-telehealth-conference/

## Telecommunications - Transforming Health Care

Health care providers will continue to rely on telehealth technologies to conduct clinical activities and will see their provision of services adapt to the increasing power of the technical systems they use.

Major innovations in the provision of health care will come about through the use of mobile devices and remote monitoring for telehealth. These two will continue to merge.

Rural communities will experience expanding access to health care services as telehealth technologies are introduced and made readily available.



**The Impact of the *TEACH*(Te**lehealth **A**fter **C**OPD **H**ospitalization) ***Program* on the 30-day Readmission Rate for Medicare Advantage Patients with COPD**
10th Annual Global Partnership for Telehealth Conference March 20-22 Cordele, GA
https://gpth.org/the-10th-annual-global-partnership-for-telehealth-conference/

## Post-Presentation Questions

## Post Presentation Question 1

Are telehealth regulations consistent across America?

A. Yes

B. No

C. Somewhat

D. Maybe

E. Don't Know

## Post Presentation Question 2

Which of the following modalities is not considered a telehealth solution?

A. Synchronous audio-visual communications

B. Store and forward communications

C. Telephone interactions

D. Remote monitoring

E. Don't Know

## Post Presentation Question 3

Can telehealth services be implemented before there are state regulations defining its activities?

A. Yes

B. No

C. Sometimes

D. Maybe

E. Don't Know

## Post Presentation Question 4

What is the greatest barrier to implementing telehealth in Florida?

A. Reimbursement for services

B. Lack of fast Internet connection

C. Concerns about privacy and security

D. Restrictions on health care licensing

E. Don't Know

## Thank you for your attention.

## Questions?

Christopher B. Sullivan, PhD
Image Research, LLC
cbsullivan@imageresearch.com
850-591-2821

This presentation, with notes, is available at:
www.imageresearch.com/telepharmacy